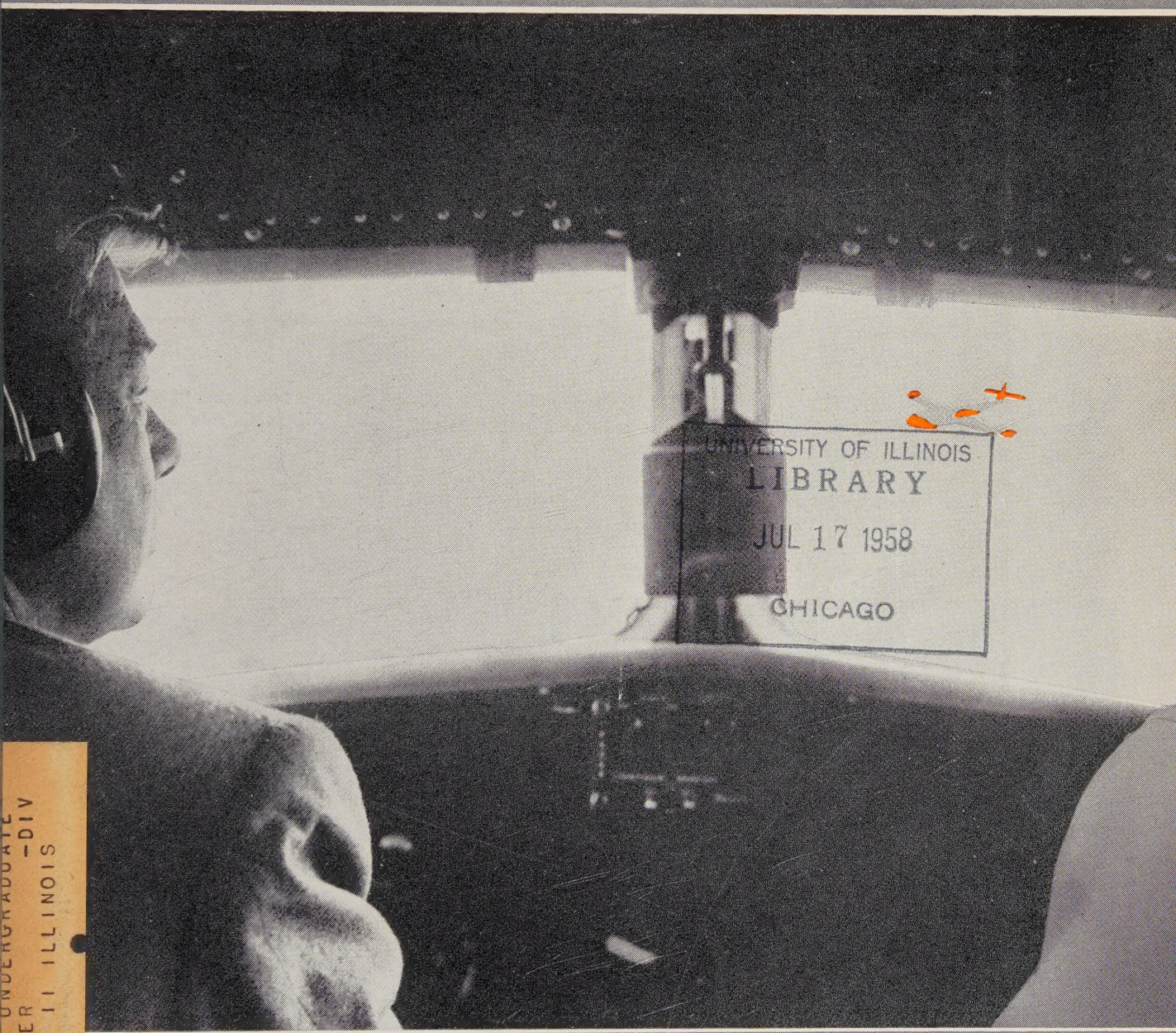
Skyways

FOR BUSINESS

JULY, 1958

OFFICIAL PUBLICATION OF NATIONAL BUSINESS AIRCRAFT ASSOCIATION



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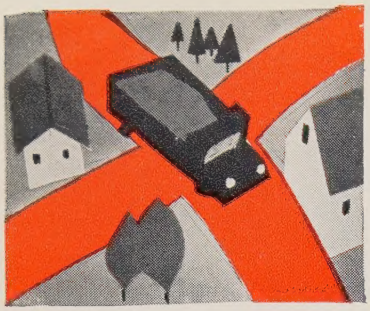
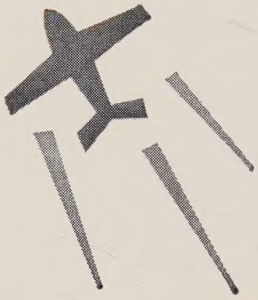
- **The Airport and Business Aviation**
- **Who Has Priority on the Company Plane?**





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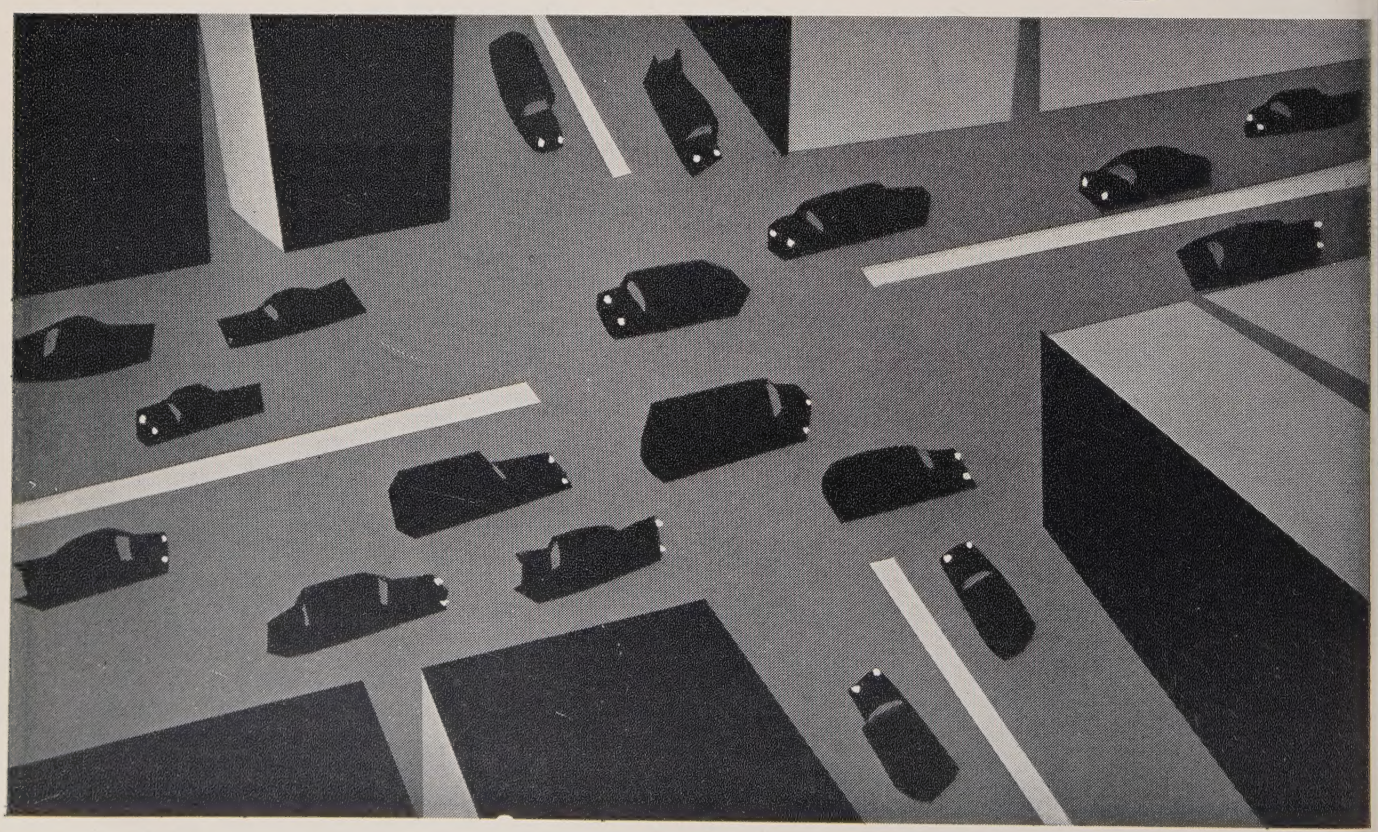

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Skyways FOR BUSINES

The official publication of the National Business Aircraft Association

COVER: "Traffic One O'clock—one-half mile!" Few ground-to-air transmissions are more likely to curl the hair on the back of a pilot's neck than this typical Radar Traffic Advisory from an ATC facility. For lack of altitude information, the pilot must still strain to spot and recognize possible confliction. "Decorate for Safety" in this issue offers the most immediate answer to the admitted deficiencies of "see and be seen" system with which we must live for some time. Owner and pilot, Arthur Godfrey; plane N1M, DC-3, with Day-Glo on nose, wing, tail.

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BPA
Member Business Publications Audit of Circulation, Inc.

VOLUME 17, NUMBER 7

SKYWAYS is published monthly by Henry Publishing Co., Emmett Street, Bristol, Conn.; Editorial and Executive Offices: 425 Fourth Ave., New York 16, N. Y. Printed in the U.S.A. Single copy; 50c. Subscription Prices. U. S. Possessions, Canada and Pan Am. Union $9.00 for 3 years, $7.00 for 2 years, $4.00 for 1 year; all other countries add $1.50 per year for postage. Please give title, position and company connection when subscribing. Six weeks required for address changes (give both old and new). Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited materials. Accepted as controlled circulation publication at Bristol, Conn.
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Price of the new Cessna 310B: $59,950 f.a.f. Wichita. Call your Cessna dealer (Yellow Pages of phone book) or write CESSNA AIRCRAFT COMPANY, Dept. S-27, Wichita, Kan. Inquire about Cessna Lease Plan.

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the LAS word

by HERB FISHER

International aviation authority, veteran test pilot, author

Lockheed Aircraft Service is the largest and oldest company in the world devoted to the maintenance, overhaul and modification of all aircraft types. Its facilities are said to be the most complete in the industry.

Since its founding in 1938 as the service division of Lockheed Aircraft Co., LAS has processed more than 55,000 aircraft — helicopters to 4-engine airliners, single-engine jets to 10-engine bombers.

Eleven years ago, Lockheed's service division was incorporated as a separate but wholly owned subsidiary company—LAS—to provide even better service for Lockheed planes as well as independent service for all types of other aircraft. Today, LAS itself has two subsidiaries—LAS-International and LAS-Overseas.

The accumulated technical experience of LAS is vested in four ultra-modern overhaul bases: at New York International; Oakland and Ontario, Calif., International Airports; and Honolulu Airport.

LAS has pioneered complete engineering and manufacturing functions in several significant post-war developments:

First Constellation and DC-6 conversion to high-density interiors . . . The first U.S. military cycle-reconditioning program . . . First airline fleet maintenance and overhaul on a fixed-price-per-flight-hour formula . . . First helicopter conversion to scheduled passenger service . . . First major military jet maintenance program . . . First major airframe [illegible] version of radar picket aircraft[illegible] Maintenance and overhaul sup[illegible] of airline and military fleets on[illegible] Berlin and Pacific Airlifts . . . [illegible] B-26 conversion to executive airc[illegible]

Military and commercial airc[illegible] serviced by LAS are flying in e[illegible] corner of the world—over all oce[illegible] deserts, jungles, the Antarctic. LA[illegible] follows up with world-wide techn[illegible] assistance. LAS emergency te[illegible] repair dama[illegible] aircraft at acci[illegible] sites anywhere[illegible]

Herb Fisher

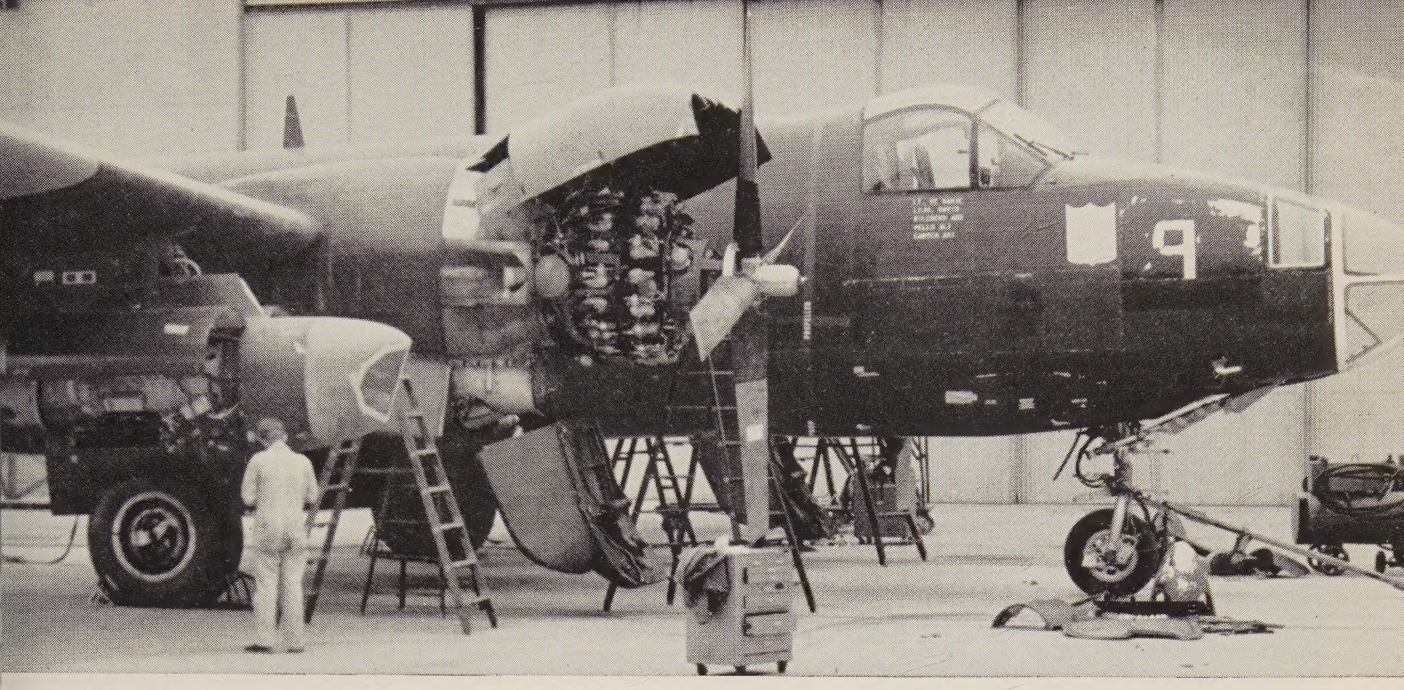
LAS' custo[illegible] roster since [illegible] war has embra[illegible] almost every [illegible] jor internatio[illegible] air carrier fl[illegible] into the Un[illegible] States, as well [illegible] major U.S. domestic carriers and [illegible] Air Force and Navy, including [illegible] entire East Coast fleets of Airbo[illegible] Early Warning aircraft. Overse[illegible] LAS-O has assisted Japan in ma[illegible] aircraft and jet-engine overhaul p[illegible] grams, plus manufacture of T[illegible] trainers. A current technical ass[illegible] ance and materiel program invol[illegible] Japan's 22-million-dollar manu[illegible] turing of anti-sub patrol aircraft.

In World War II, LAS opera[illegible] seven major overhaul and modif[illegible] tion installations, repairing 22,[illegible] battle-damaged craft alone plus mo[illegible] fying and servicing thousands [illegible] others.

In the Korean War, LAS modi[illegible] and rebuilt hundreds of planes.

This extensive variation in airc[illegible]

New 400-hour maintenance cycle for WV-2 Early Warning picket aircraft is performed at LAS-Honolulu, which has 27 shops.



Navy P2V-7 is modified at LAS-Ontario for 100-below "Operation Deep Freeze" in Antarctica.

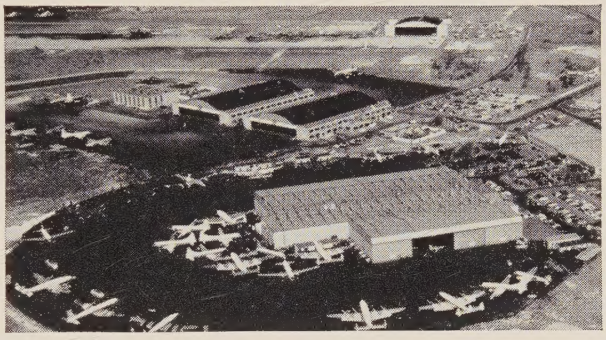
ustomers is testimony to the ompany's experience level and the eady adaptation of its personnel and acilities to individual maintenance equirements. In this, the Champion Spark Plug plays a vital dual role:

First, LAS services a great many f the major airlines of the world. *In heir exhaustive flight evaluations of very available spark plug, the airlines*

isher (l) interviews LAS President J. Kenneth Hull r) and W. J. Weisbruch, Acting Plant Superintendent.

ave repeatedly proved that Champions are best for reliability, service, conomy. All the major airlines of the world fly with Champions.

Second, as LAS President J. Kenneth Hull told me: "At LAS we must ouple diversified know-how with nly the finest first-line quality products in order to maintain our record f on-schedule deliveries of airworthy ircraft."



Foreign and domestic commercial planes plus U.S. military aircraft are serviced at LAS-I, New York International, largest East Coast independent maintenance facility.

LAS-I Base Manager, said: "Our customers depend on the finest quality plugs for peak engine performance throughout a *wide* heat range, whether operating in dry desert heat, jungle humidity or severe Arctic cold."

Paul Kovac, Senior LAS-I Powerplant Engineer, said: "Plugs may be affected by anything that goes wrong with an engine. If a plug is out of heat range, if it has a tendency to preignite or foul, schedule delays will follow. *Champions have proven their excellent quality control on our test- and flight-lines.* They're mechanically strong and do not experience core nose ceramic failures. We've found Champion a quality standard in an industry that *knows* high standards."

LAS' unique service program — Equalized Maintenance, Aircraft Rotation, planned spare-parts inventory and fixed-price-per-flight-hour formula—assures commercial and military operators maximum flight utilization through minimum ground time. The LAS Equalized Maintenance plan was applied to Early Warning aircraft, a marked departure from traditional military maintenance programs, to provide the USAF with higher utilization and operational flexibility.

Among Lockheed's earliest service jobs were modifications for such aviation greats as Amelia Earhart, Lindbergh, Sir Hubert Wilkins. Recently, LAS "royalized" a plane for His Majesty Haile Selassie, Emperor of Ethiopia, by installation of luxurious movable compartments—one of the most unusual conversion jobs in air transport history.

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J. L. "Pete" Peters (l), Flight Line Dept. Head, recommends Champions for cars and planes. His Champion-fired Thunderbird won 35 trophies. Pilot is Capt. Edward Schank, LAS-USAF Acceptance Officer.

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Editorial

THE SILVER LINING

Despite the recession affecting most American industries, including aviation there is a very rosy hue to the general aviation picture in mid 1958.

More than 92,000 civil aircraft, excluding commercial operations are registered with the CAA.

The growth of aircraft utilization in general aviation has not been much affected during the last eighteen months of depressed business conditions. General aviation bought almost as many new airplanes in the first quarter of 1958 as are operated by all domestic and international scheduled airlines—1,659 to be exact.

A recent control tower count of a cross section of airports shows that general aviation accounts for almost twice as many movements as do scheduled airlines.

Pilot certificates are steadily increasing. There was a little more than sixty per cent increase in all classes of pilot certificates issued during the first six months of 1957 over a comparable period of 1956.

While American business owns and operates approximately 26,000 of the 92,000 registered civil airplanes, it is certainly true that a much greater number of aircraft listed as private are also used in business enterprise. It is equally true too, that 26,000 business airplanes fly more hours than the balance of the general aircraft fleet. Most of these hours are under all-weather conditions and the passenger fatality rate for 100,000 hours of business flying is 1.12 compared with a scheduled airline passenger fatality rate of 3.78 per 100,000 hours.

The Senate has just passed legislation authorizing an emergency fund of $75 million for civil airport construction. Starting with 1959, there will be available in the annual Federal Airport Development Fund $100 million. This money will be used to match local funds in airport construction. Here is another constructive step tending to insure aviation's future even though it did not have the support of the Department of Commerce which is charged with the responsibility of expanding American transportation.

In the face of generally depressed economic conditions and in the face of what is chaotic and, it is hoped, a transitional air traffic control problem, such progress certainly shows the ascending potential general aviation.

When economic adjustments are made and business has its feet on firmer ground, we can expect an even sharper upward trend in general aviation.

The establishment of independent Federal Aviation Agency sponsored by Senator Mike Monroney and Congressman Oren Harris, may be effected ahead of preliminary planning. General Elwood Quesada was not scheduled to submit a plan for such an independent Federal Aviation Agency until January, 1959. When this Agency comes into being and authority is given to one responsible agency to control the air space, all aviation can look forward to better days. With such an Agency there should not be any more TACAN fiascos involving the taxpayers in hundreds of millions of dollars in needless taxes as well as our Government's embarrassment with more than sixty countries in the Free World who are objecting to junking VOR/DME. There should be no more military grabs of airspace nor violation of common sense control of military aircraft using civil airlanes.

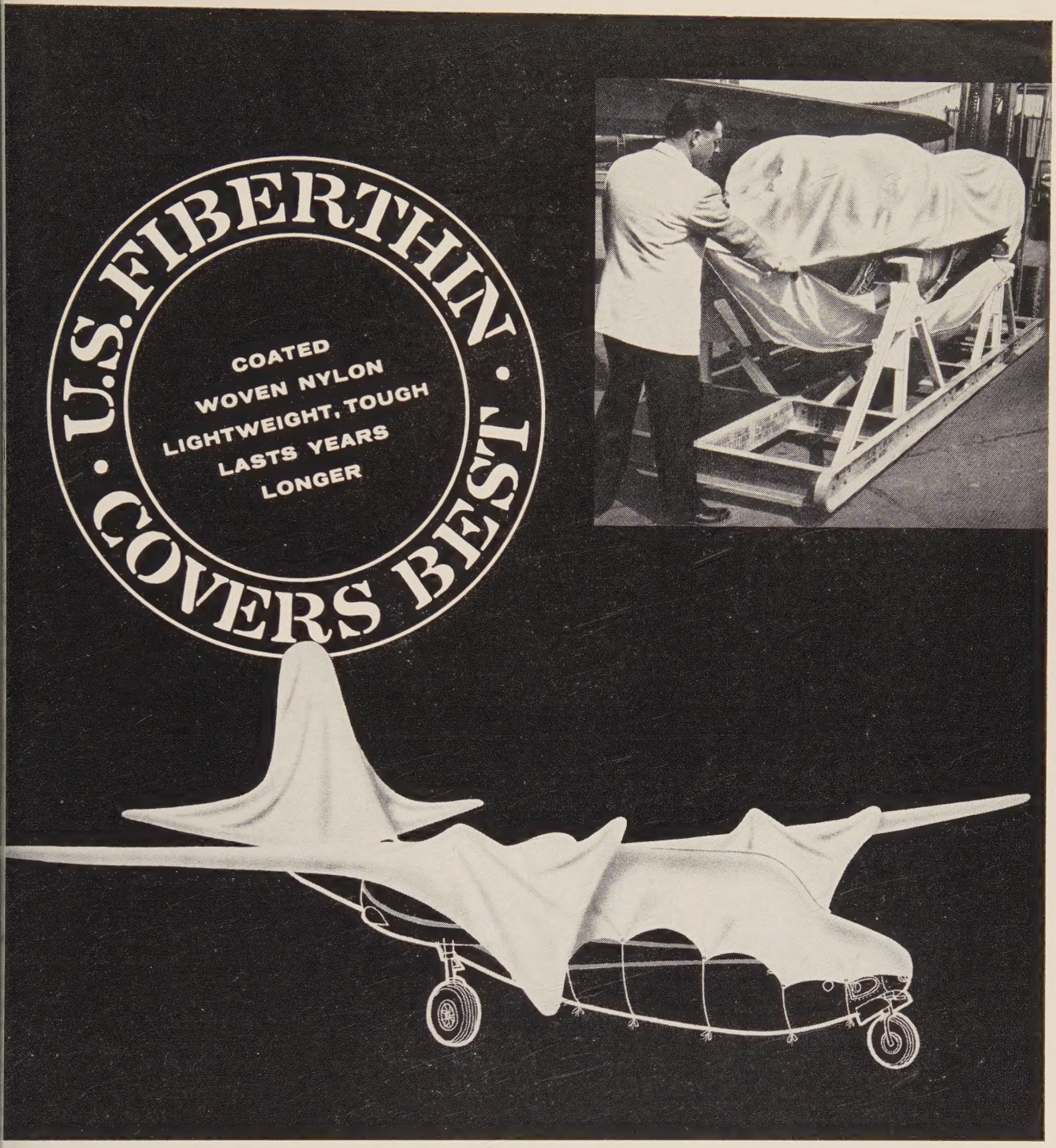
The silver linings of the clouds that have hung over civil aviation these past few years truly seems to be showing around the edges.

NUMBER ELEVEN COMING UP

It's about twelve to Eleven—it's about twelve weeks until the Eleventh NBAA Annual Forum.

The scene is historic Philadelphia. The place, the Bellevue Stratford Hotel. The dates, September 22, 23 and 24, 1956. Incidentally, the National Association of State Aviation Officials will start its three day meeting at Philadelphia, at the same Hotel, on the last day of NBAA's Meeting, September 24.

It's time to be talking to the Boss about arranging to attend the Eleventh Annual Forum.



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U. S. Fiberthin Air Seal jet engine cover shown in photo above fabricated for Boeing Airplane Co. by Seattle Tent & Awning Co., Seattle, Washington

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NBAA . . . Director's Notes

McDonnell's four-jet answer to Lockheed's JETSTAR was shown to NBAA on a recent visit to the St. Louis factory.

Looking like a cut-down version of the Boeing 707, the McDonnell 119 has been kept under wraps and previously shown only to the Air Force.

If you wonder about the close-to-the ground engine pods and how ingestion of nuts, bolts, and other runway debris is prevented . . . McDonnell has a unique answer in a high compression air jet that blasts foreign material away from the "suck-in" end of the engines. Projected performance details are still confidential—but we can say this . . . Lockheed's JETSTAR has a worthy competitor.

* * *

At Long Beach Airport, Calif., Memorial Day, the Douglas DC-8 made its first flight. Scott Miller, AiResearch's customer relations manager, and Jim Dyerly, Chief Pilot, McCulloch Motors, saw to it that yrs. truly had a front row seat to watch the initial take-off.

3,200 feet of runway were all that was used as the DC-8, grossing 198,500 pounds, was eased into the air by A. G. Heimerdinger, Douglas test pilot. The P&W J-57 turbojet engines at take-off trailed huge clouds of black smoke which, if this is standard carbon output, could cause a real louse-up at times when airport visibility is marginal.

* * *

Also got a show-through of North American's mock-up of their Sabreliner, twin-jet utility trainer-transport which is up for Air Force evaluation. Cockpit has remarkable visibility. Ship will have 1,200 Nautical mile range with 2 crew, 4 passengers, baggage and cruising speed of 436 knots at 41,000 feet. Commercial price tag, if and when available to business aircraft owners, around $350,000. Al Smith, NAA's customer relations, points out that this is an "iffy" price tag—and could go down depending on military orders.

If you are in the LAX area—it's worth a trip over to NAA to see this one.

* * *

Washington scene: Federal Aviation Agency Bills, introduced by Senator A. S. Mike Monroney and Representa- from under the Department of Com- the Maryland Capital-National Guard Tragedy, will pull present CAA out tive Oren Harris on the day following merce and establish it as an independent agency. CAB, with economic and regulatory-making supervision will remain under Commerce.

Hearings on the bill, held last month plus speedy Congressional action should see the FAA legislated into being before end of summer.

* * *

All business aircraft pilots are urged to cooperate in filing IFR flight plans regardless of weather, along all Federal Airways when their flight plan calls for altitudes of 10,000 feet and above. At recent NBAA Board of Directors meeting, invitation from Stuart Tipton, Air Transport Association Head, was read which invited business aircraft cooperation in the above-10,000 program which is in effect on July 1st.

NBAA President Joseph B. Burns and the Board unanimously agreed that with the new Federal rule making and with the compliance of military aircraft with stricter IFR procedures, the business aircraft owner, pilot and passengers now can have a greater degree of en route safety than ever before at the higher altitudes.

Bill Lawton

Suite 344

At the invitation of Monsanto Chemical Co., the Board of Directors held the May Board Meeting in St. Louis. The Board at this time wishes to express their appreciation for the most delightful "social hour" and delicious buffet supper held at the Holiday Inn. Those present for the Board Meeting: Joseph B. Burns, NBAA Pres., representing The Fuller Brush Co.; E. M. Beattie, General Electric Co.; B. J. Bergesen, Ford Motor Co.; Ralph E. Piper, Monsanto Chemical Co.; H. W. Boggess, Sinclair Refining Co.; Jim Ketner, Jr., Texas Eastern Transmission Corp.; also, your Executive Director, Wm. K. Lawton.

Membership applications approved at the meeting, and A WELCOME TO NBAA MEMBERSHIP, were: Mrs. R. R. M. CARPENTER, New Castle, Del., operating Beech D18S, maintained and flown by Air Service, Inc., Fixed Base Aviation. John McC. Morgan, Pres. is NBAA Rep. and Chief Pilot; ONTARIO PAPER COMPANY LIMITED (Subsidiary of TRIBUNE COMPANY, Chicago, Illinois), Newsprint Mfgr., operating DC-3 and Grumman Mallard. E. B. McGraw, Asst. to Pres., is NBAA Rep., executive in charge of aviation activities, and F. W. Hotson, is Chief Pilot; WESLEY WEST INDUSTRIES, Houston, Texas, oil production, operating DC-3, Beech Bonanza and Piper J-3. Ray E. Goodwin is Chief Pilot. (REGULAR MEMBERSHIP)

GENERAL PRECISION LABORATORY INC., Pleasantville, N.Y., Doppler automatic air navigation equipment, airborne NAV computers, recorders, airborne TV systems, operating Twin Beechcraft and DC-3. L. R. Chapman, Asst. to V. P., is NBAA Rep. and executive in charge of aviation activities. Harry J. Bailey is Chief Pilot; HEUSSLER AVIATION, Buffalo, N.Y., executive aviation, aircraft leasing and helicopters. Jack B. Prior, Chief Pilot, NBAA Rep. and executive in charge of aviation activities, operating DC-3 and Bell 47G2; NATIONAL AERO SERVICE, INC., Chicago, Ill., fixed base operator, storage and servicing of executive aircraft and commercial air lines, Lloyd R. Miller, Serv. Mgr., is NBAA Rep. and Chief Pilot. Chas. E. Cessna, Pres., is executive in charge of aviation activities; ROLLS-ROYCE, INC., New York, aero engine sales and service, Ted Wayne, Asst. Sales Mgr., is NBAA Rep., and R. M. Kendall, Director, is executive in charge of aviation activities. (ASSOCIATE MEMBERSHIP)

In keeping with Section 1, Article 111 of NBAA's By-Laws, the Annual Business Membership Meeting for the election of directors and for the transaction of such business as may properly come before the meeting will be held on the first Thursday in September, and, in keeping with Section 4 of Article IV the Board appointed the Nominating Committee consisting of Bob Bergesen, Ford Motor Co., as Chairman; Jim Ketner, Texas Eastern Transmission Corp., and E. M. Beattie, General Electric, as members.

The Awards Committee was also appointed consisting of Gerard J. Ege, International Harvester Co., as Chairman; and Henry W. Boggess, Sinclair Refining Co., and Ralph E. Piper, Monsanto Chemical Co., as members.

The Program Committee was appointed, consisting of John H. Winant, Sprague Electric Co., as Chairman; Walter C. Pague, ARMCO Steel Corp. and C. F. Zimmerman, Continental Oil Co., as members.

SEPTEMBER 22, 23, 24, 1958 NBAA's 11th ANNUAL CONVENTION — BELLEVUE STRATFORD HOTEL, PHILADELPHIA, PA.

With the ever growing importance of air traffic control, KUDOS to the following NBAA members carrying the ball on various ATC Advisory Sub committees around the nation and advising Dick Groux at National Headquarters of local problems. E. M. Beattie (GE), R. G. Rickner (U. S. Industries)—NEW YORK; W. H. Dameron Jr. (Sears, Roebuck & Co.)—ATLANTA; James M. Richter (Columbia Geneva Steel), Arthur E. Walker (Standard Oil of Calif)—OAKLAND; John H. Winant, W. R. Benedett (Sprague Electric), Horace Wood (Gillette)—BOSTON; John Carroll (Youngstown Airways)—CLEVELAND; Scotty E. Miller (AiResearch)—LOS ANGELES; John Hall (Youngstown Airways)—PITTSBURGH; W. E. Hinton (Chrysler), R. J. Hixson and T. P. Van Siever (Ford), C. D. Cunningham (GMC), D. R. Anderson (Anderson Aircraft Radio)—DETROIT. Location

(Continued on page 47)

Flying Cattleman Likes SAC Cessna Service

W. R. (Bob) GODDARD ENDORSES FLAT RATE SYSTEM FOR "310"

W. R. (Bob) Goddard knows the best in ranches, oil wells, and airplane service, having invested successfully in each. He pilots a Cessna 310 to cover interests throughout the southwest, a favorite destination being his great cattle spread in the "Hereford Heaven" section of south central Oklahoma.

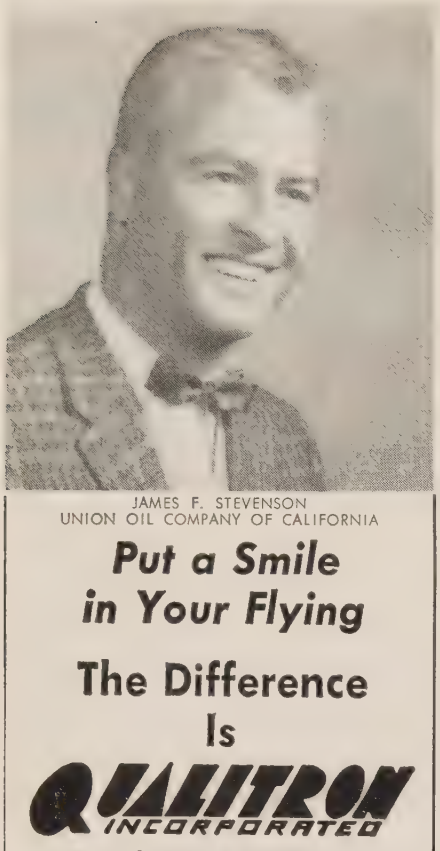
Booted Bob is pictured in discussion with Earl Webb, Southwest Airmotive service sales manager. The topic is SAC's new Flat Rate Catalog, a page of which lists overhaul prices for the Cessna 310 — airframe, engine, accessories, propellers, and instruments. Bob Goddard not only knows the best in Cessna service, he consistently gets the best at Southwest Airmotive and endorses SAC's flat rate way of doing things.

By the way, that table in the middle of the ramp isn't so far-fetched. It symbolizes the fact that wherever you are, and whatever the size or type of your airplane — large or small — Southwest Airmotive will make it convenient and economical for you to enjoy the finest One Stop Service in all America.

Southwest Airmotive Co.

LOVE FIELD, DALLAS
DISTRIBUTION DIVISIONS: KANSAS CITY • DENVER
1932 A QUARTER CENTURY OF LEADERSHIP 1958

Circle No. 6 on Reader Service Card



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Aviation Roundup

HIGH DENSITY AIR NAVIGATION (HIDAN) airborne system will simplify air traffic control, reduce collision hazard, according to General Precision Equipment Corp. Press demonstration in DC-3. The method "provides means for fully implementing the new traffic control methods being developed by the Airways Modernization Board." HIDAN has two parts: Radan automatic navigator and an aircraft position indicator. If pilot gets off course, instruments show what must be done to return to plan. Availability: March, 1959. Cost: $75,000, in limited scale production, for dual installation.

★ ★ ★

READING AVIATION'S ANNUAL MAINTENANCE-OPERATIONS MEETING named National Distillers and Chemical (NBAA member) Corp.'s Lockheed PV-1 "Flagship of the U.S. Industrial Fleet." Chief pilot is Harold Curtis.

★ ★ ★

REMINDER THAT SWITCH TO GREENWICH MEAN TIME ("Zebra time") by all CAA facilities took place last month does not require use by general aviation. Both in air-ground contacts with non-airline civil aircraft and weather service broadcasts, CAA facilities should include appropriate standard times. Use of Zebra time by business aircraft crews where practicable will save conversion and expedite handling, especially on IFR plan flights.

★ ★ ★

HIGH VISIBILITY PAINT TO MARK CAA PLANES ordered by James T. Pyle, Civil Aeronautics Administrator. CAA's 92 aircraft getting design approved by Air Coordinating Committee in conjunction with program ordered by President Eisenhower to take all possible steps to solve air safety problems.

★ ★ ★

NEW LEAR ADF TRANSDUCER enables any non-directional, low-frequency transmitter to be used as omnirange facility, announces W. P. Lear, board chairman. Transducer weighs less than 2 lbs, can be applied to any make automatic direction finder used in conjunction with "LIFE" (Lear Integrated Flight Equipment, see Skyways, June, page 13). With combined equipment, pilots can fly a radial inbound or outbound on non-directional, low-frequency stations. Using such transmitters as directional references for automatic flight can be important to flying safety in certain areas, says Lear.

★ ★ ★

ELECTED PRESIDENT OF AMERICAN ASSN. OF AIRPORT EXECUTIVES, Henry P. Julliard of Louisville, Ky., at 31st annual convention held at Fresno, Calif. 500 airport managers from all parts of U.S. attended meeting.

★ ★ ★

AIRCRAFT INDUSTRIES ASSN. reports the X-ray techniques have moved on to the flight line, providing new methods of avoiding costly overhauls, as well as to add safety factors. X-rays give certain warning of a possible failure long before it could occur, and replacements are made, such as signs of fatigue failure after exposure to flying stresses and strains, such as the impact of constant landings. Pictures are taken just as medical X-rays.

★ ★ ★

PIPER COMANCHE "250," with a 250 hp direct-drive Lycoming eng., is now in production. Plane has exceptionally low weight per hp ratio with a service ceiling of 20,000 ft and gross allowable weight increased to 2800 lbs.

GUARD AGAINST THE DANGER OF MID-AIR COLLISION!

t is a fair estimate that there are between 10 and 5 "near misses" everyday over the continental U.S. —*Mid-air Collision Symposium*

OLD® "Safety-Sight" Fluorescent Colors protect you against ne two main causes of mid-air collision and "near-misses"!

1. LACK OF COLOR CONTRAST IN REGULAR PAINT

BOLD® "Safety-Sight" colors are extremely *high contrast* colors. On cloudy days, at dawn, at dusk, these amazingly brilliant colors make your plane stand out sharply, even at distances of over 10 miles for smaller aircraft.

2. HIGH ALTITUDE MYOPIA

BOLD® "Safety-Sight" Fluorescent Colors can actually be "sensed" before they are seen, especially at higher altitudes when pilot vision is subject to nearsightedness. **BOLD®** "Safety-Sight" Fluorescent Colors are easy to see even with peripheral vision!

OLD® "Safety-Sight" Fluorescent Colors have been tested by ie USAF and are used at numerous bases both for aircraft mark-gs (especially on training planes) and to outline warm-up, runway, nd test areas on the field.

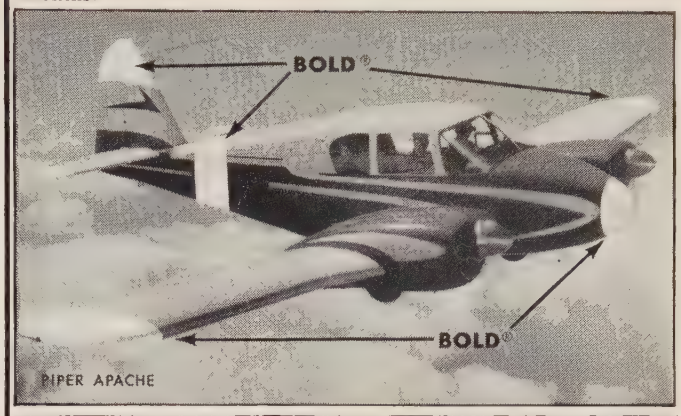
OLD® "Safety-Sight" Fluorescent Colors are inexpensive to apply nd maintain . . . last for months!

se **BOLD®** "Safety-Sight" Colors to make runway cones, field oundary markers, and tower and hangar installations "pop-out" om surrounding terrain.

Lawter Chemicals, Inc., has pioneered in the formulation of qual-y fluorescent pigments since the early 1940's and offers immediate ast-to-coast delivery from four conveniently located plants.

These quality formulated fluorescent colors cost only pennies to pply over a white undercoat, the recommended method of secur-ng highest possible fluorescent brilliance. They go on quickly, easily with brush, roller or spray can and perform best when used on wing tips, fuselage stripings and tail assembly stripings. They are also available in *pressure sensitive sheets* and rolls; 3, 6 and 12 inch widths . . . $2.00 per sq. ft. (Aircraft Orange).

These colors, when applied as directed, will afford high-contrast safety protection against mid-air collisions for periods up to 15 months.



SPECIAL INTRODUCTORY OFFER! AVIATION **BOLD®** KITS
(With required White Primer, Aircraft Orange, and Clear Sealer.)

KIT #200—200 sq. ft. $16.50, shipping weight 10 lbs.
KIT #400—400 sq. ft. $32.00, shipping weight 20 lbs.
KIT #800—800 sq. ft. $60.30, shipping weight 40 lbs.
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Circle No. 8 on Reader Service Card

Air Your Views

Dear editor,

We very much appreciate your permis-ion to reprint the article "A System for Tracking With the ADF" by Captain Bivens.

Inclosed is a copy of the May issue which ontains the reprint of your article.

Thomas J. Sabiston, Lt. Col., U.S. Army

Editor's Note: As it appears in the U.S. Army Aviation Digest—"Captain O. B. Bivens is a pilot for Eastern Air Lines. This article first appeared in Skyways for Business under the title, "A Bearing Com-parison Method of ADF Track Flying." It was later reprinted by The Air Line Pilot magazine.")

Dear sir,

Skyways for Business is a publication hat all the executive pilots of the Phoenix area read. We do maintenance and engine overhaul for many company-owned aircraft, making our office the gathering spot for Who has Done What for Which Company. Each pilot wants to be first when it comes o having the latest equipment in his air-craft, and sooner or later they discuss what he other company pilots have had done from your "In the Business Hangar."

Alyce Decker
Dan Decker Airmotive

(Editor's note: Thank you, Mrs. Decker.)

Dear Torch Lewis,

Read your article in Skyways (May, p. 12), and I am very pleased with the way you handled the situation. I certainly wish there had been a few more articles written after the true facts had been ascertained as you did here. Most of the reports in the papers and even in the industry were sadly in error (re the Mike Todd crash).

Anthony J. Ming, vice president
Trade Ayer Co.

Dear editor,

I never joined the OX5 Club, but I keep reading about it in Skyways, so I might as well send in some biog on myself and be in.

Commercial license No. 423. Learned to fly on Curtiss Seagull (OXX6) with Jack Tweed at New Haven Air Terminal. Owned a no good American Eagle with my brother. Later, owned a Travel Air OX5, then a Fairchild FC2. Operated Hutchison Flying School, Inc., at Bates Field, Mobile, Ala., until the recession (?) sucked it under, and I ended up on the right seat of Fords and Fokkers for TWA flying with such as Eddie Belande, Alton Parker, Bill Coyle, Marion Hoblit, Waldo Waterman.

When FDR took over and TWA and everybody else cut back, I ended my career in commercial aviation. I've been with the film business since then, except for six years with the Navy during the war.

Have been here for 18 months as Chief Advisor to the R.I. Government on films.

Best regards to many old friends in OX5.

Juan C. (Jack) Hutchison
Louis deRochemont Associates, Inc.
Djakarta, Indonesia

Dear editor,

In Skyways for this May, there is an article "Number Please" which states that "Public telephone service for airborne business . . . was initiated Sept. 15, 1957." . . . Over ten years earlier it was used from the Atlas Sky Merchant cooperating with Illinois Bell, in fact all over the United States thru the ship to shore frequencies. In 1947 we made the first international calls from South America and in 1948 at points around the world.

Besides the daily press, record can be found in the American Telephone and Telegraph Co., New York. The Aero Digest in June 1950 had an article "Flying for World Business" which gave further details.

Possibly the author knew this, but he leaves the impression that the current effort is new. Anyhow we found it was quite useful for business appointments as well as social. One outstanding example was, on an overnight flight between Australia and New Zealand I talked to the Secretary of Interior at Wellington while several hundred miles out of Auckland. At that time ship and air passage between the two countries was suspended, and yet here we were confirming that we would be in on time as set by a schedule during the year before.

Edwin E. Aldrin
Montclair, N.J.

Dear Herb (Fisher),

I read your very interesting article in the June issue of SKYWAYS describing the Lear integrated flight equipment. You have developed into quite a talented writer. Best regards, Cass

George S. Cassidy, Brig. Gen., USAF
Hq., Atlantic Division, MATS

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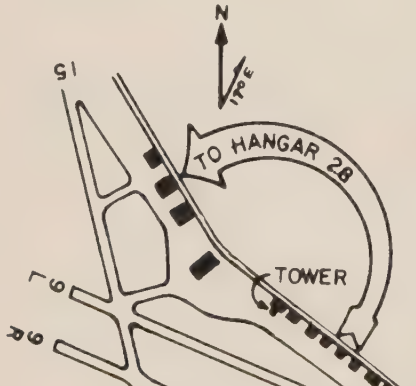

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VISIT OUR PILOT AND
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Circle No. 9 on Reader Service Card

Aviation Roundup

FRANK J. SAKSER, AIRPORT DIRECTOR PALM BEACH COUNTY advises the USAF has recently lifted its restriction on single-engine utilizatio of the Palm Beach International Airport at W. Palm Beach, Fla., in that the may now land for the purpose of clearing the Port of Entry facilities. Pilot must have on file a "Hold Harmless" AF Form 180 and have in their possessio a properly signed AF Form 181 permit. For further information about this, co tact SKYWAYS.

★ ★ ★

ARTHUR WILSON POPE, JR., Chief Research Engineer of Waukesha Moto Co., received the Horning Memorial Board Award during the Society of Autc motive Engineers Summer Meeting in Atlantic City, N.J. He was cited for hi more than 30 yrs of distinguished active service in the field of mutual adapta tion of fuels and engines.

★ ★ ★

ALLEGHENY AIRLINES has recently marked one of its DC-3's wit "Rocket Red" DAY-GLO paint. This is the first airline to test this high visibilit daylight fluorescent paint made by Switzer Bros. See SKYWAYS' article: "Wil a Touch of Glo Avoid Accidents," Dec. 1957, p. 46. See this issue, p. 13.

★ ★ ★

NATIONAL CAR RENTAL SYSTEM announced campaign to continue t emphasize "Fly-Drive Plan" to stimulate awareness of flexibility of flying lon distances, and picking up a rental car to get around at the destination, with eas credit available. National's airport coverage doubled in 1957.

★ ★ ★

CONTRACTS AWARDED BY CAA to NBAA Members: Federal Tel La Nutley, N.J., $26,000 for 10 TACAN ramp test sets; Collins Radio, Ced Rapids, Ia., $19,244 for 132 tube testers; Bendix Radio, Baltimore, Md., $15,16

★ ★ ★

GENERAL ELECTRIC has developed a powerful airport beacon-lamp, pr viding a beam clearly visible at 30,000 ft and from 30-miles away (clea weather), even in daylight. Present ones are only visible from 10,000 ft o below.

★ ★ ★

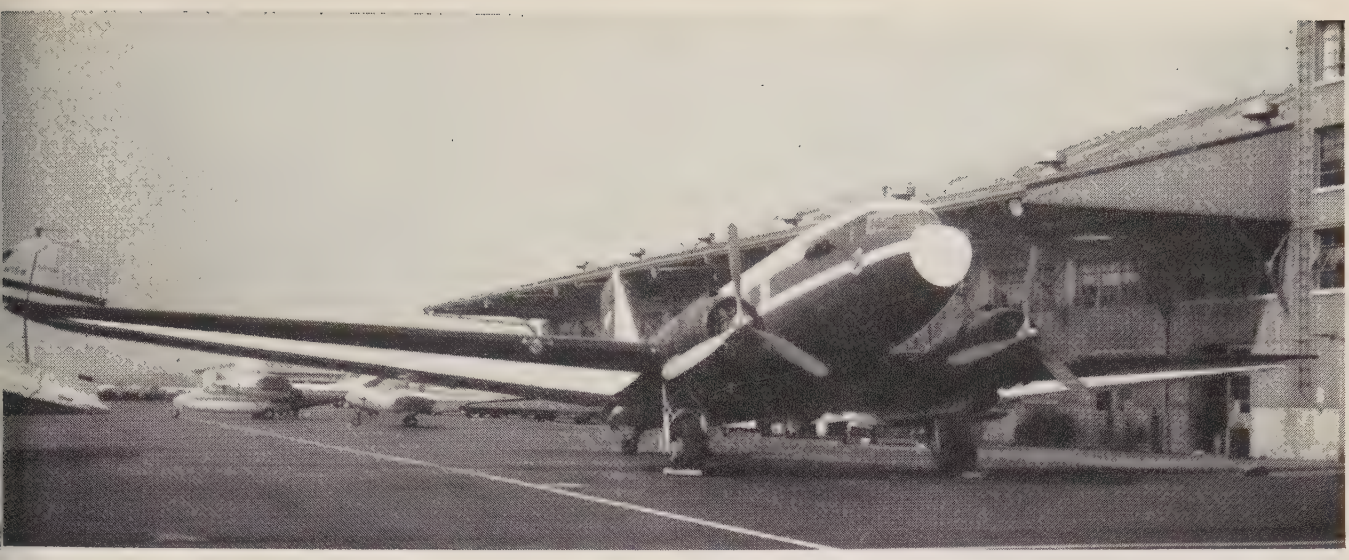
AIRWAYS MODERNIZATION BOARD's James L. Anast, Deputy Technica Director, announced receipt of 14 proposals from industry for an experimenta communications system designed to improve future national air traffic contro

★ ★ ★

WHO'S NEW: Philip G. Cawrey appointed as Aircraft Sales Mgr of Weste Div AEROQUIP, Burbank, Calif. . . . AERO ELECTRONICA de MEXIC S.A. at International Airport, Mexico City, appointed NARCO Mexican Di tributor . . . George McSherry, now Executive Director, Dade County Po Authority, Miami, Fla. . . .

★ ★ ★

DATELINES . . . July 27, 4th International Air Show, Bellingham Airpor Wash. . . . Aug. 7, 8, 9, National Convention of OX5 Club, Hotel Statler, Lo Angeles, Calif. . . . Aug. 7, 8, Annual Conference, Western Region, Americ Society for Quality Control, El Cortez Hotel, San Diego, Calif.



EYE-PLEASING VS. EYE-CATCHING *is the issue when planning to mark with high-conspicuity paint. As experience is gained, aesthetic as well as effective designs have evolved as on this Godfrey Productions (NBAA member) DC-3 at Teterboro, N.J. Airport.*

DECORATE FOR SAFETY!

by Joseph Bush

Despite all the hysterical political and layman reaction to the recent air collisions, there is no one in the industry who believes today that 100% control of all traffic is around the corner. Nor is there even a glimmer of hope that the famous "little black box" solution (anti-collision warner or avoidance system) is going to be with us for at least a few years. Nevertheless, the collision threat is growing faster with each passing day and summer is upon us with its seasonal traffic peaks.

There is no insurance company that will or can sell a policy that will avert the possibility of a mid-air collision. It has been dramatically demonstrated not only that the "See and be Seen" technique is inadequate today, but also that it is the only method of collision avoidance available which can be applied to all airspace users everywhere. The main defect is in the quality of the normal, unaugmented human vision. The human eye, unassisted, is not adequate to the situation.

There are several methods of improving this situation. At night it has been found that flashing lights of appropriate color and intensity can not only attract attention earlier but can be coded to facilitate interpretation of such factors as relative direction and speed. Some systems are almost as good in varying daylight conditions, but are comparatively expensive and heavy, not suited to all types of aircraft.

High conspicuity, fluorescent paint for application to aircraft has been under investigation by the CAA for several years at TDEC, Indianapolis. Long before that, however, one company, the Switzer Bros. of Cleveland, Ohio, engaged in a program to develop a practical means of augmenting human vision for detection and interpretation purposes. In World War II the Allies needed a safe and reliable way of locating and identifying their ground forces units to friendly aircraft. Often in battle, support aircraft were clobbering their own troops because of obsolete, inefficient means of visual signalling where radio communications techniques were unacceptable. Switzer Bros. answered with fluorescent colored panels that were easily distinguishable from above ten thousand feet.

Post-war it was realized that application of the same development to other fields had great possibilities. The purpose of most advertising campaigns is to catch the buyer's eye and then hit him with a message. High conspicuity paints and inks became one of the most successful sales boosters of all times. Their application spread into the safety field inevitably as manufacturers of sportswear such as hunting clothes and swim wear realized the eye-catching qualities.

It was apparent early that as a means of making aircraft more conspicuous in flight, it was a safety must. But first attempts frequently ended in failure as the pigments rapidly faded from the inevitable exposure to sun and heavy weather, rain erosion, and just plain adhesion difficulties with aircraft exterior materials.

The Day-Glo people deliberately withheld their product from general aviation distribution until they had the answers which merit them the credit for the first successful version of the high-conspicuity paint available on a large scale basis.

For a person who has not been exposed to the effects of this new and vital safety technique, it is difficult to realize that there is in fact a four-fold increase in the "see-ability" of any aircraft properly marked with this material.

Research has indicated that large square or circular areas are more effective than elongated or thin areas. Also, the greater the dispersion between such areas, the greater the conspicuity and ease of interpretation.

There is no insurance at any price that can reduce the statistical probability of mid-air confliction as the congestion

(*Continued on page 48*)

NEW AAAE PRESIDENT, *Henry P. Julliard, receives gavel from R. W. F. Schmidt, left, association's past president.*

the AIRPORT and BUSINESS AVIATION

A talk by Joseph B. Burns, President, NBAA, before the American Assn. of Airport Executives

I am going to speak briefly of the aims, objectives and possibilities in the business aircraft field—an important segment of American business and becoming more so.

What is the job of the Airport Executive? Basically to administer a sound, safe and efficient program at your particular airport.

And then, secondly, it is public relations, in the sense that you are the ambassadors for your community to the aviation world. And perhaps your third duty is that of planning. You have got to know what is ahead, and be able to plan for it. If I may briefly give you some idea of the business aviation of tomorrow, then I will have accomplished my purpose.

It might be interesting for you to know something about the National Business Aircraft Association, which was established 11 years ago by some of the larger corporations when they began to utilize aircraft in their business operations. They joined together for the same reason that you have an Association of Airport Executives; namely, to exchange, to protect, to plan, and to help its members, its segment of aviation.

We, as do you and many other associations, try to benefit *all* aviation—as well as our own selfish interests. That is the principle upon which both our organizations are based.

Who operates business aircraft? Are they large organizations? Small ones? Little ones? First of all, out of the first 100 largest corporations in the United States 91 operate business aircraft. These fairly substantial customers form the nucleus of the great advances that will be made in business utilizing this new mode of transportation to its fullest advantage. However, it isn't just the large organizations that use aircraft. They use the larger aircraft but by no means all of them.

I gave you a rather startling percentage of those first 100 major corporations, but the percentages decline very rapidly after that. Business acceptance rate, that is the number of aircraft per 100 active corporations, is still only slightly over 1%. In other words, *only about 1% now operate business aircraft.*

These statistics indicate there is a great potential in this business field. The realization of that potential lies in the fact that over the past five years, out of every eight aircraft added to the general aviation fleet, seven were either owned or operated *by a company* rather than an individual. Th is a natural development since business transportation affor the greatest economic capability to purchase and effective utilize an aircraft.

We can appreciate some of the problems that you men the operation of airports will face. We are going to ha to have more airports, better airports, different classificatio and styles of airports.

The CAA estimates the business aircraft fleet will increa 50% within the next five years; and within the next deca a growth from some 27,000 aircraft today to approximat 80,000 business aircraft. These increases will also refl significant improvements in performance and quality—whi points up the need for better ground handling, maintena equipment, etc.

Business flying grew from 1.1 million hours in 1946 to 4 million hours in 1955, approximately a fourfold increa Miles flown in business transportation grew even mo rapidly from 122 million in 1946 to 628 million in 1955, mo than a fivefold increase. In 1955, this category of gene aviation activity accounted for 45 percent of total gene aviation hours flown and 52 percent of miles flown. Mo significantly from the standpoint of the future developme of general aviation, increased business flying accounted f nearly 90 percent of the total growth in hours flown fro 1952 through 1955 and about 85 percent of the growth i miles flown over the same period.

By comparison, the number of United States aircraft e gaged in scheduled air transport increased 16% during 195

Active General Aviation Aircraft: By Class:			*% Used for Busines Transportatio*
I Multiengine (9 place and over)	1,128	70%	790 (I & II)
II Multiengine (under 9 place)	2,668	70%	1,858
III Single Engine (3 place and over)	25,503	56%	14,282
IV Single Engine (1 and 2 place)	31,907	26%	8,296
V Miscellaneous	2,263	5%	114
Total	63,853		25,350

(*Continued on page 42*)

ERWIN-NEWMAN Suspended Cantilever HANGARS

S. Patent No. 2,687,102

Night view of L. B. Smith's new 80,000 square foot hangar at International Airport, Miami Florida. The clear span area is 360 feet long by 80 feet deep. Vertical clearance of 22 feet

Every square foot of hangar space— a square foot of usable space

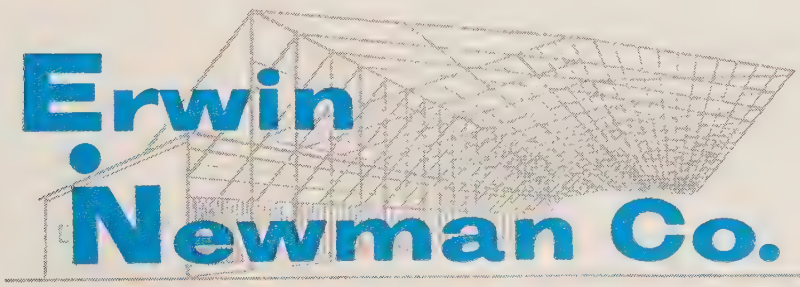
Cantilever type construction means no obstructions of any nature to interrupt the clear span space, providing perfect housing for the maintenance and storage of aircraft. Enclosed space to the rear is spacious area for workshops, parts and office facilities.

This advance design is the result of 17 years experience in building several hundred hangars, of all sizes and types, which have withstood the most exacting load forces of every area—from the heaviest snow loads of the north and east, to the hurricane wind forces of the coast and the earthquake shock loads of the west.

Consult us before you build a hangar of any size, as this new modern cantilever type building can be constructed to your exact needs and in most cases will cost no more than older fixed span or limited clearance designs.

Call, write or wire us for information

ngle Cantilever
ouble Cantilever
cing Cantilever



Erwin Newman Co.

Designers and Constructors

- Any Height
- Any Length
- Any Depth

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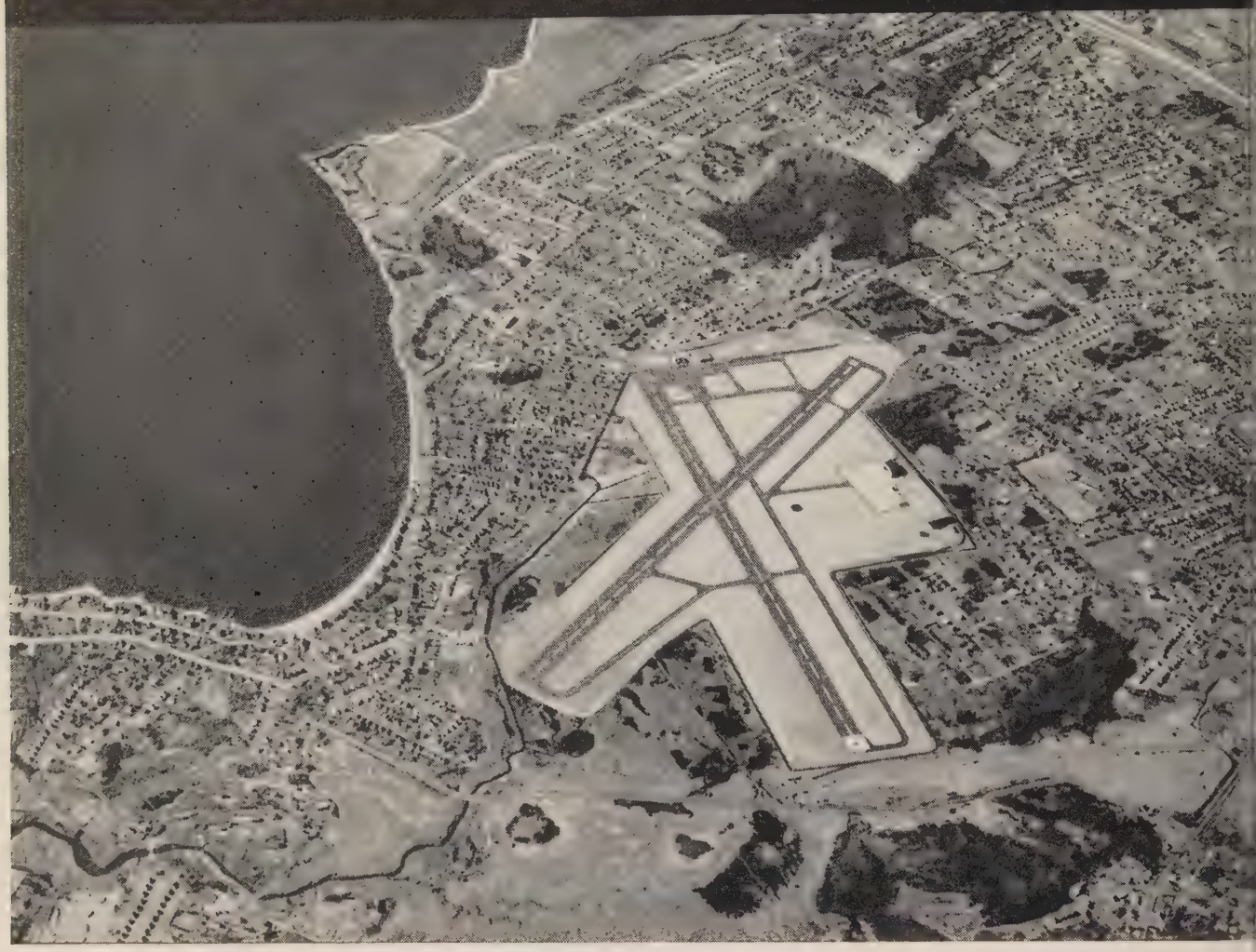
Test your cross-country memory

Can you name this airport?



Clue: *The New England city it serves is the home of a famous Ivy League university.*

Now test your aviation-oil memory: Do you remember these important reasons why Gulf oils are better for your engine?

1. In addition to providing efficient, thorough lubrication, Gulf Aviation oils help keep engines *clean—and safe!*

2. Gulf-clean engines can go longer between overhauls, because there's less wear and tear on engine parts.

Choose either Gulfpride Aviation Oil Series D, the detergent oil, or Gulf Aircraft Engine Oil, the straight mineral oil. Both keep your engines Gulf-clean and safe.

The airport? You Yale men will recognize it as New Haven Municipal Airport, located four miles southeast of New Haven, Conn. It has two paved runways—the longest, 4,768 ft.

Here you'll find Gulf Aviation products and friendly, efficient service under supervision of Jack Usher, president, Usher Aviation, Inc.

GULF

AVIATION PRODUCTS

Fly safely with a Gulf-clean engine

- *How important does a man have to be before he has priority for using the company plane?*
- *How far down (within the company structure) should priority rights extend?*
- *Or should the answer rest solely on the importance of the man's "mission"?*

WHO HAS PRIORITY TO THE COMPANY PLANE?

by Robert K. Polson

The company plane may be dispatched according to the status of the man within the company . . . or according to the importance of the man's mission (regardless of who he is). Each has its proper place. Sending the man who knows which screw to turn may mean the difference between a production line which runs and one which doesn't. Yet there is another side to the story.

A great many companies use their aircraft for routine transportation of Executives. The question here is: "Where does this privilege end?" The problem of "Authority to request" is also quite different from "Permission to fly." Company policy may permit any employee to fly (once the trip has been made-up) yet this person may not have "Authority to request." The specific problem lies in setting up a priority policy based on a sound principle.

There is some fairly strong argument that this question ought to be solved according to the company wage structure. Not for any reasons of prestige or importance, but because this method *offers maximum benefit to the company.* A business aircraft saves considerable time . . . man-hours of Executive-time which can amount to a staggering sum over the period of a year. Industrial Engineers, commonly called "Efficiency Experts," solve this type of problem by multiplying the amount of time-saved by the value of the passenger's time. This answer must of course be multiplied again by the number of people involved.

If we disregarded the amount of time-saved, and multiplied the number of passengers by the value of their time, we would have the total value of time which is now *exposed* to that unknown amount of time-saved. Since all these factors are multiplied together, constant exposure is the same thing as constant benefit. (A passenger load of 2 men who are paid $20 an hour represents the same benefit as a passenger load of 4 men who are paid $10 an hour.)

Inasmuch as the aircraft cannot save time until it begins to move, this passenger load expressed in dollars is really *exposure-per-mile.* In order to get the total exposure for the flight, you must multiply by the mileage involved, or . . .

Total Exposure = Passengers × Wages × Miles

Over a distance of 200 miles, both examples above would produce 8,000 units of exposure. The introduction of mileage into the formula merely insures that the utilization is the same in both examples (unequal utilization = unequal benefit).

Since we multiplied all three factors together in the formula, the exact order of multiplication will not change the final answer, and you could just as well say . . .

Total Exposure = Passengers × Miles × Wages

We now have *Passenger-Mile-Dollars.* With this unit of measurement, you can chart the rise and fall of potential benefit within your company.

By dividing the company wage (*Continued on page 44*)

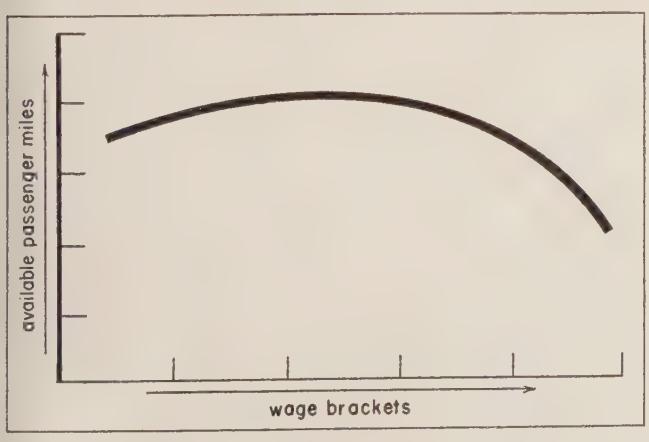


Figure 1

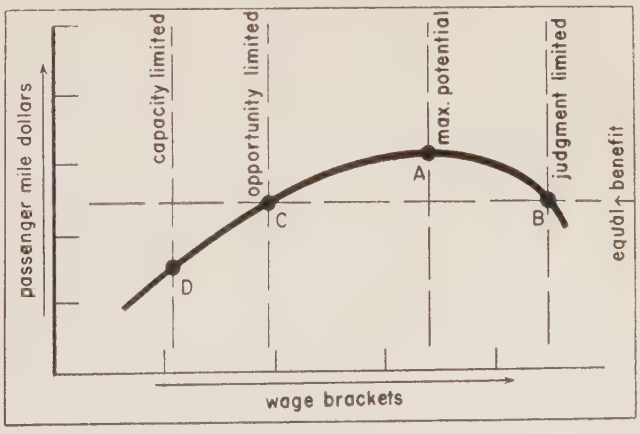


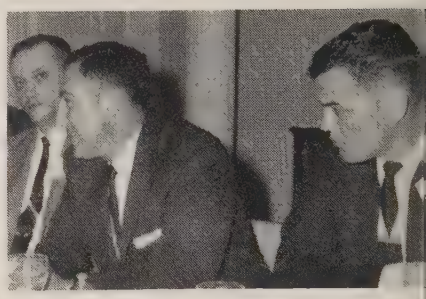
Figure 2

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

April 1958 *Wings Club, New York*

UNDIVIDED ATTENTION *is given B. C. Fisher, Neutronic, by George Pomeroy (r).*

LISTENING, *Hermann Waker, Robt. McClintock, E. Paul Kovac, William Campbell.*



N.Y. PORT AUTHORITY'S *P. J. Landi; L. R Musacchio, CAA (l); A. E. Gossett, AC (r*

SPARK PLUG AND IGNITION

Operational Characteristics Discussed By Leaders and Users

PART 2

Part 1 of SKYWAYS' Round Table (see page 15, June issue) described pertinent important thoughts concerning: Fuel Additives, Fouling Characteristics, Cleaning of Plugs, and Combustion, as put forth by industry leaders. Led by William S. Campbell, ass't service mgr., Scintilla Div., Bendix Aviation, as moderator, Part 2 continues.

Campbell, mod.: We'll start with:

Heat Ranges

Smith: Heat range is all important as far as a spark plug for an engine is concerned. Paul Kovac brought out a very important point when he mentioned the use of thermocouple spark plugs to determine what plug shall go into an engine. The choice of spark plug for a particular engine used to be pretty much a matter of trial and error. The engine manufacturer during his initial testing of the engine would put a spark plug in the engine which seemed best for the conditions under which the test was run. In service that plug might not be the one required, and changes had to be made after the actual operating conditions had been determined. The thermocouple spark plug is a plug that the engine and spark plug manufacturers have been developing over a period of several years.

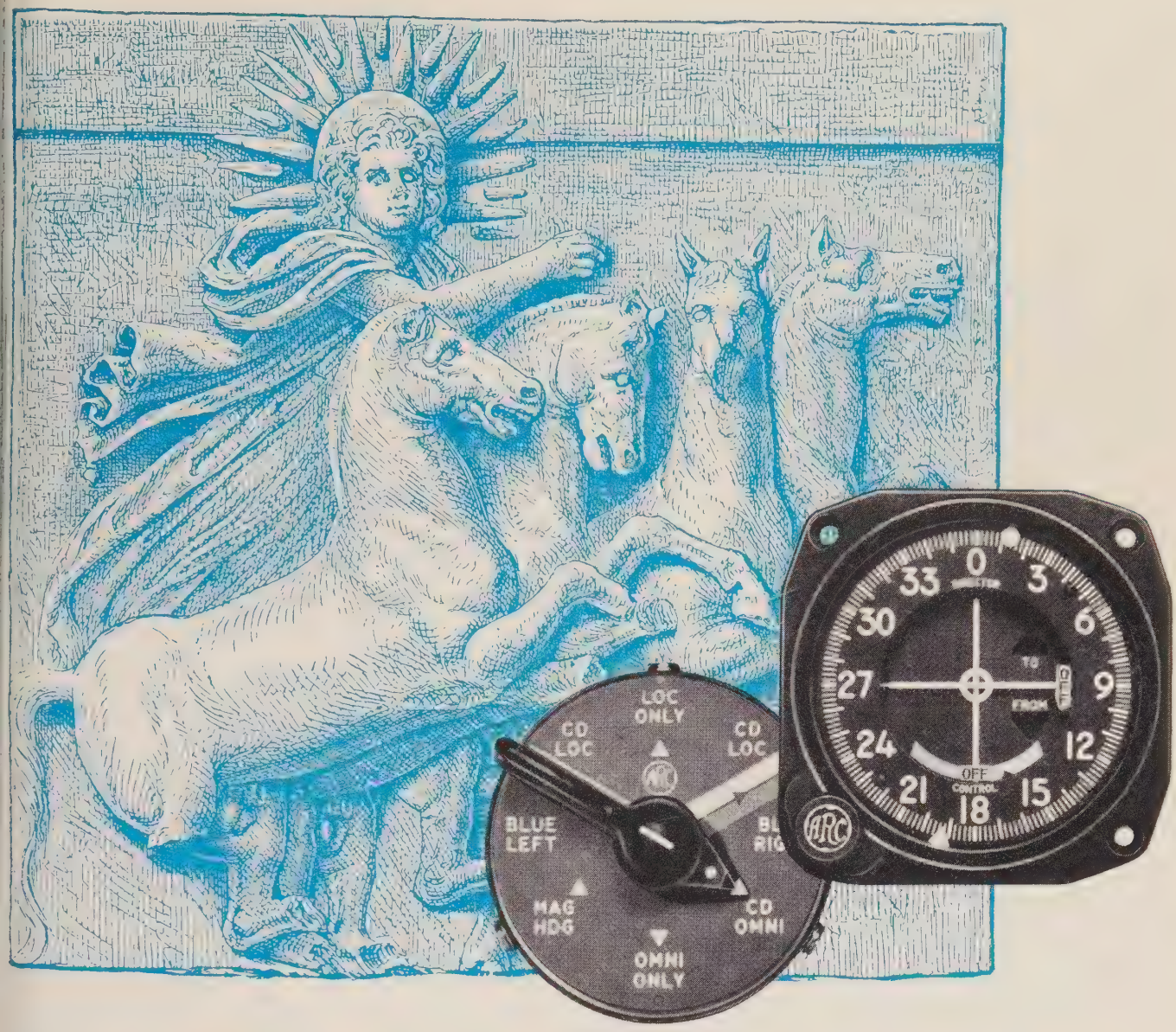
It incorporates a thermocouple at various points inside the spark plug on the electrode so that the actual temperature at which that part of the plug is operating can be accurately measured. Using these thermocouple plugs, we can get a much better picture of what the plug is doing in the engine. We can do a lot more, and actually reach the ultimate, if we make thermocouple spark plug tests in an airplane in active service. Then we know just exactly what is happening, and you can tailor a spark plug to those conditions.

Haxby: Since fouling comes partially from deposits, then, from the deposits' standpoint, heat range is also very important. A spark plug accumulates deposits on the nose and other sections. The deposits don't bother anything if their resistance remains high. Chemically it is known that the deposits' resistance is governed by what the deposit is and by temperature. As the temperature of the lead oxy-bromide deposits is increased, their resistance goes down, and they become conductors. You must use plugs of a heat range that either will not accumulate deposits or, if they do accumulate deposits, will keep them at a temperature below that at which they become conductors and allow shorting. The other approach, already mentioned, is the chemical approach, the use of the TCP additive in which we actuall modify the deposits so that we chang resistance characteristics versus tem perature. A higher deposit temperatur can be attained when using TCP befor it begins to become conductors.

Robert McClintock (*Scintilla Div. Bendix*): We know that in excessive idling we get a great deal of foul ing. Yet, you have identical airplanes and one fellow says he does not have the problem. He uses the same engine the same plans. Is the answer tha carburetor and head temperatures, etc. must be maintained to help solve lead fouling?

Anderson: That is what I was driv ing at when I mentioned the fact that we feel there is a responsibility on our part as a spark plug manufacturer to develop, if possible, plugs with better anti-fouling characteristics. The man operating his airplane does not have the intimate knowledge mechanically of what he should do, or what he can do to give those added protections that the airlines are able to train their op erating crews to accomplish.

There is a need on our part to bolster the ability of the spark plug to accept the operational variable without getting in trouble. We also have the need of educating mechanics to set proper idle mixtures for added fouling protection. There is a tendency to set idle mixtures on the rich side . . . the engine is less



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apt to die. The amount of carbon deposits that will form on the plug core nose is directly in ratio to the amount present in the combustion charge and when idling with low plug temperatures, carbon material will build a very adverse deposit. If you reduce the amount of carbon present with a proper idle mixture setting, then there is going to be less spark plug fouling. All of those things go together. There is an added operating problem with the helicopter engine when it runs at high rpm and low manifold pressure. Vacuum in the manifold drags oil by the intake guides and piston rings, and this is carbon fouling material. A spark plug must live under these conditions. Those are some of the things we have to fight operationally and design against if possible.

Gap of Plugs

Campbell: How about the engine manufacturers starting out on this?

Smith: One of the things we look for when we pick a plug is one that appears to have a gap wear rate which is consistent to what the operator can live with. Once we think we have that, we don't get much further. We have never specified a maximum gap. We leave the choice of that to the operator. Some may think plugs have eroded to a point where the gap is large enough to warrant removal at 200 hours and another with the same equipment may let the same plug stay in the same engine to 400 hours. As long as the engine is running satisfactorily we don't care what the plug gap is.

Mecca: Our manuals generally carry a gap specification. It serves as a guide for servicing the spark plugs. We have operated from .012 through .030 in an 80 octane engine and noted little effect from the change in gap.

Campbell: We're doing something right now, in our work with the engine manufacturers, mainly Lycoming. The so-called small engine . . . the power in those engines is something fantastic . . . we have been getting into a lot of rough idling and ignition problems in general. Scintilla now has a new type of design which has the same feature as is presently used in the R-3350 engine, namely, a retarded magneto. We have magnetos at Lycoming, Continental and Aircooled. We're working directly with Continental and Lycoming and have some magnetos which have a retard and advance operation in the same magneto. They can be run retarded at idle and at takeoff and do much better with those engines. Also, in this small engine type ignition we always used an impulse coupling as an auxiliary measure. Due to speeds, vibrations and a combination of things, the impulse coupling in many instances was becoming engaged at high speed and would tear things up generally. With the two-breaker magneto which we have now, we are able to eliminate the impulse coupling. It looks as though it is going to improve the performance.

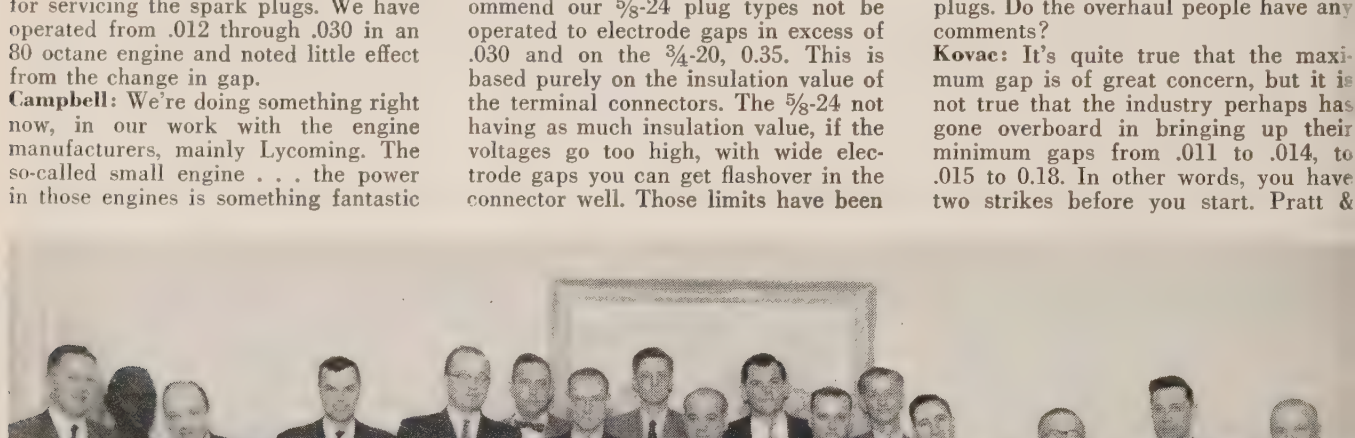
Anderson: The initial gap is based a great deal upon the electrode configuration. Heavier electrodes require wider gaps to get satisfactory ignition of the combustion charge. The maximum gap at which the plug can operate depends a great deal upon the operator or the engine's ability to stay out of fouling troubles. If you have an installation that is relatively free from fouling troubles, the spark plugs can accept much wider gaps. Some operators who have fouling, resolve this trouble by pulling the plugs at a shorter period of time by keeping the electrode gaps down to a lower value. The ignition systems as a whole can accept any gap that a spark plug can accept. We recommend our $\frac{5}{8}$-24 plug types not be operated to electrode gaps in excess of .030 and on the $\frac{3}{4}$-20, 0.35. This is based purely on the insulation value of the terminal connectors. The $\frac{5}{8}$-24 not having as much insulation value, if the voltages go too high, with wide electrode gaps you can get flashover in the connector well. Those limits have been set, and have been determined from many years' experience in the field.

Church: Adding a side note, gap wear is a major concern to the spark plug manufacturers because when a combination of gap wear and fouling enters the picture, sometimes it is necessary to pull the spark plugs for cleaning and servicing or gap resetting. When the engine is scheduled for a certain maintenance period, and the operator has to pull the plugs at an odd interval, and it is very costly. Spark plug manufacturers give a great deal of consideration to the materials that go into the electrodes of spark plugs. We continually try to develop materials that give less electrode wear and maintain a more constant gap.

Anderson: Bill, you might comment on the effect of ignitions systems type on electrode erosion rate of spark plugs. It is quite possible that out in the general commercial field someone might hear stories of airlines operating plugs 500 to 600 hours between removals. They might get ideas that they can do the same with spark plugs in their engines and perhaps get into trouble due to lack of knowledge of why the airlines are able to operate satisfactorily some plugs up to these exceptionally long operating periods.

Campbell: A good point. On the lighter aircraft the erosion rate of spark plugs gaps is much higher because we use a straight high tension system. We have low tension ignition systems on the larger engines and that gives much lower erosion rate. Right now we are working on a low tension system for smaller engines to try to improve service life between overhauls and spark plugs. Do the overhaul people have any comments?

Kovac: It's quite true that the maximum gap is of great concern, but it is not true that the industry perhaps has gone overboard in bringing up their minimum gaps from .011 to .014, to .015 to 0.18. In other words, you have two strikes before you start. Pratt &



PANEL MEMBERS *standing, (l-r) R. P. Foster, J. R. Church, A. E. Gossett, J. M. Shimeck, J. L. Rhodes, L. C. Smith, Ted Wild, R. L. Anderson, Hermann Waker, L. R. Musacchio, J. R. Ingram, P. J. Landi, G. C. Pomeroy, W. J. Ort, B. C. Fisher. Seated, (l-r) V. J. Mecca, L. P. Haxby, E. G. Balogh, E. P. Kovac, William S. Campbell, Robert McClintock, B. H. Gale, and Clifford Hudder.*

Whitney says that .020 is the maximum gap you should allow your spark plugs. We have production spark plugs from the manufacturer that are gapped at .018. If you have .003 erosion at 100 hours, you should be changing spark plugs at 100 hours, if not earlier. Is it not true that perhaps more study should go into determining whether that wide gap is actually necessary?

Anderson: Study has been made, and the wider initial gaps for massive electrode plugs is necessary. There is some lack of understanding of what is required to get proper propagation of ignition, and the electrode configuration and gap has much to do with this. The larger electrodes must have larger initial gaps or they just won't fire satisfactorily, specially during idle and lean mixture cruise power conditions.

Campbell: When we started with the low tension systems for larger aircraft engines, we had an erosion rate of about .001 for 100 hours. With the increase in power and different fuels, the overall demand increased tremendously. Naturally, the erosion rate has gone up now with the low tension system to where it used to be with the high tension system.

Anderson: We concur completely. The erosion rate on plugs is effected by many variables that we have discussed here, and Bill has brought out the added one of severity of operation, the combustion temperatures, etc. There are electrode temperatures in operation today that were unheard of a few years ago. However, development of improved electrode materials has kept pace quite well with new engine and spark plug requirements.

Campbell: When we started with the small aircraft engines in use today, you recall they were anywhere from 75 to 125 horsepower. Now the engines are up to well over 200 horsepower, and we are still trying to make the same ignition system do the job. We now have a new ignition system for the executive type aircraft. We can put those on the Apache, Twin Bonanza, Aero Commander and the large twin-engine executive type aircraft.

Ted Wild (*Union Carbide*): Speaking as an operator, we have both the P&W-cb 16 and the hc series Wrights and found that we have to change plugs every 240 hours. We start out with a gap setting of .016. After 240 hours we were up to .025. We have to pull them at .025 because we begin to get idling and other troubles if we let them go any longer.

Cleaning of Plugs

Campbell: Money saved is quite a problem. Actually, it accounts for the interest in getting this so-called "one-run-plug," meaning from one engine overhaul to the other. Champion, do you want to start on that one?

Anderson: The period of time that a spark plug can be operated before reconditioning will vary greatly depending upon the ignition system, the severity of operation and the engine model, etc. It will vary in extremes of

AMERICAN AIRMOTIVE'S *J. R. Ingram (l) and Hermann Waker, Aerodex, listen in.*

4:1 as far as times are concerned. It also depends a great deal upon the operator's technique and ability to operate the engine to keep the plugs clean. Our policy has been that reconditioned spark plugs will give completely satisfactory service, but it is important that the reconditioning job itself be done satisfactorily. We feel that if the spark plug is mechanically sound and cleaned properly, the reconditioned plug will operate as well as the new plugs.

Mecca: Mr. Anderson, a question: Do you hold any limit on the number of repair and cleaning cycles on spark plugs, or is this anticipated performance irrespective of the number of times the plug has been reconditioned?

Anderson: We set no time limit for the spark plugs. It depends entirely upon the mechanical condition as found by visual inspection and by tests. On reconditioned plugs, the time will vary fantastically in the field, again depending upon the engine and ignition system that operates them. I can cite one type of plug in very common use: the RHH37N long reach plug that is used in R3350-BA3 and R4360 engines. This is a combination of extremes. The R3350-BA3 is probably more severe on electrode erosion rate than any other engine in the field, because of its high tension ignition system and the extremely long shielding leads with their high capacitance. We can experience all the way from 500 to 2,000 hours total life on this same model spark plug between the R3350-BA3 engine and the low tension equipped R4360 engine. This is how much extreme there can be in the total life of spark plugs as experienced in the airlines operations today.

Shimek: We at AC feel if half the electrode is gone you should scrap it. As far as how many times it has been overhauled—well, you can overhaul a plug once and ruin it or overhaul it a dozen times. All other things equal if you have half the original electrode left, that is about the borderline for the safe use of a plug. You can use it longer, but you will taking a chance of getting into difficulty.

Kovac: We have found that many of the overhaul agencies are using a very caustic agent in the cleaning of spark plugs which alters the heat range of that spark plug, and could give you trouble. It is our recommendation to use a vapor cleaning machine which is not quite so hard on it.

Allison Gossett: (*AC Spark Plug*): That's very nice for the large operator, but the small operator is not usually in a position to buy a vapor cleaning machine, so proper techniques and cleaning materials are very important.

Foster: A question on abrasives. Do some operators use aluminum abrasive in spark plug cleaning rigs?

Anderson: The abrasive that we furnish, and highly recommended, is aluminum oxide. It is more severe on the insulator noses as Mr. Kovac points out, but much of that can be offset with proper technique in cleaning. The design of spark plugs has much to do with whether you will be able to get a satisfactory cleaning job. Trend is to finer abrasives for our dry cleaners than we have used in the past. We are also going to recommend lower pressure on these new machines to further protect against over abuse to the plug during reconditioning.

Shimek: We have come out with a new mechanical vibrator cleaner which does an excellent cleaning job on lead deposits. It is a high frequency, claw type unit which goes right down inside the shell cavity and in about 10 seconds takes all the lead deposits out without touching the electrode. We have found that about 70% of the plugs in the field were ruined by improper or excessive cleaning blast. This new mechanical cleaner is a big aid to cleaning plugs without ruining the electrodes.

Campbell: Is there any trade name to it?

Shimek: It is called the AC-AV19-3. One more thing on cleaning spark plugs. We ran into an operation where they had very short life with spark plugs after they reconditioned them. We found that the lead and carbon deposits were loaded with silica. They used sand in their cleaner, and part of this was trapped in the shell cavities when the plugs were installed in the engine. The plug fouled out in 10-15 hours, and the operator wanted to know why an overhauled plug wouldn't work as "good as new." You probably run into some of that, too.

Anderson: We've had similar reports, especially in helicopter operations.

Pomeroy: What's going to happen to the spark plug business when jets come in?

Campbell: When first we heard about the jets we thought we would only have glow plug and that would end it. There'd be no ignition system. The complexity of the jet ignition system is growing by leaps and bounds. Altitude flame-outs present quite a problem and the energy that has to be produced by the ignition system today is absolutely phenomenal.

Anderson: As we forecast the industry as a whole, the reciprocating engine is going to be around for a long, long time, especially in the smaller aircraft field. Until methods are developed to build the turbines a little more economically, I don't think they're going to make much of an inroad on the smaller aircraft field. We think there's going to be a definite shift in the trend of where we sell these spark plugs to

(Continued on page 36)

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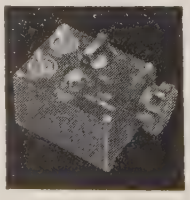

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By Russ Brinkley, Pres.

At any meeting where aviation folk are assembled, there is almost certai to be a clique of participants who wil seek a secluded corner of the room, fo the prime purpose of directing the con versation toward the early days of avia tion. If you inquire as to the identity o these individuals, you are likely to b told that they are members of the OX Club. The group won't object to you joining the mystic circle, but, unless your aviation experience dates bac quite a few years, it is likely that yo will find yourself strictly on the listen ing end of the confab.

The most recent instance occurred a Houston, Texas, during the annual con vention of the Aviation Writers Associa tion, when a large group of OX5 Clu members had an opportunity to mee the men and women who write an disseminate much of the worlds' avia tion news and feature stories. Henry Erdman of Trans-Texas Airways headed the delegation of early airme which met with the scribes at a cockta party, staged by Ed Burke of Firesto Tire & Rubber Company. The spot wa the famous Shamrock Hotel.

In their dealings with present da airmen, the writers can usually hol up their end of the conversation, a they are well-informed about what i going on in the aviation world whic provides their bread and butter. How ever, when they were mated in con versation with the stick and wire boys it turned out to be a matter of AW asking the questions and the OX5er supplying the answers.

This provided a healthy opportunity for the two dedicated organizations to get together for what turned out t be an interesting session for all con cerned. Certainly, the OX5 folks were thrilled to meet such featured writers as Vern Haugland, aviation editor o the Associated Press; Lois Henry who publishes SKYWAYS; George McLaughlin, who has been writing on air topics since he was associated with Glen Curtiss, and many others.

On the other hand, many of those who record the progress of aviation from day to day, obtained much infor mation on the early flying days, t provide subjects for their later writing efforts. It is likely that, in the month to come, you will be reading about th results of what happened, when thes two groups, got their heads together And it should make for something big

Aviation Writers Association Week-long Meeting Emphasized Aspects of Business Aviation

Business aviation played a major role in the Aviation Writers Association's annual meeting held at Houston, Texas.

The nation's top aviation writers and representatives of the leading aviation industries gathered at the Texas city to learn of new developments and to witness many exciting demonstrations involving new equipment.

Airlift from key points of the U. S. for the writers was provided by the Special Air Mission division of the Military Air Transport Service. On the New York airlift, the Port of New York Authority and United Aircraft co-"hosted" a very delightful in-flight luncheon and refreshments.

More than 300 AWA members attended the five-day meeting.

Highlighting the first day, in the area of business aviation, was the demonstration of the Sikorsky HSS-1N, latest Navy version of the familiar S-58, illustrating its capability of day and night flight under instrument conditions.

Sikorsky's automatic stabilization equipment (ASE) is an electronic system which unburdens the pilot of the necessity of making constant adjustments in control of the helicopter. Introduction of an automatic "hover coupler" makes it possible for the pilot to place the helicopter on automatic control at 200 feet altitude and 80 knots airspeed and automatically come to a zero ground speed hover at a 50-foot altitude over a pre-selected spot.

This first public flight was made at the Naval Air Station, Corpus Christi, by Jack Stultz, a Sikorsky engineering test pilot and member of the company's avionics branch.

Grumman Aircraft (NBAA member), evening reception host, was expertly represented by the Navy's demonstration precision formation flying team, the Blue Angels, who flew the F-11F-1 Tiger jets. Lunch was sponsored by Lockheed (NBAA member) Missile Systems Division.

Looking at the oil industry from an oil field was a new aspect for most of the AWA group. An entire day was spent in the field. Humble's Friendswood Oil Field was visited for seismic, exploration shot and actual drilling demonstration. Goodyear Tire and Rubber Co. (NBAA member) plant showed petrochemicals used in Missile Age aircraft components. Shell Oil Co. (NBAA member) Refinery demonstrated an aviation gas producing unit. The same three companies sponsored lunch at which Robert A. Wells, staff engineer, Gulf (NBAA member) Research Center, spoke on "High Energy Aviation Fuels."

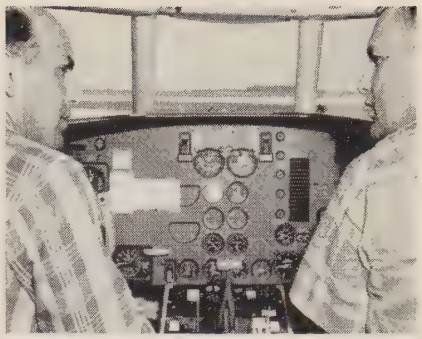
Dow Chemical Co.'s magnesium plant at Freeport was toured. A Texas-style barbecue ended the day at Dow's Lake Jackson picnic grounds.

Aerojet-General Corp.'s (NBAA member) Ed Rice discussed "Standby Rocket Power for Airplanes" at a breakfast (brandy punch, strawberries 'n cream, lamb chop, etc.) hosted by

JR. JATO GETS CAA APPROVAL *as Merrill Grix, CAA Region 4, presents Type Certificate to G. E. Rice, mgr. commercial JATO Sales, Aerojet-Gen, Corp. The unit is held by W. L. Gore, left, Customer Relations, and J. W. Jeffreys, JATO Sales.*

Aerojet. Telling of the many uses of JATO, Rice stated that "Hundreds of single engine and light multi-engine aircraft owners are awaiting the availability of the recently certificated 15Ns-250 'Jr. JATO' standby rocket engine." He said that considerable foreign interest has been shown and that exports to friendly nations have been approved.

This smaller unit (the second Aerojet



PAUL VANCE TRIES JETSTAR'S *left seat while Bob Gross, Lockheed engineer on the business size jet, does some explaining. Vance, of Monsanto Chemical (NBAA member), saw the JetStar with other AWA members at Houston International Airport.*

JATO model to be so certificated and one of the only two certificated rocket engines for aircraft in the U. S.) is suitable for single or multiple installation in aircraft from the small business aircraft to multi-engine airplanes in the 10,000 lb. gross weight category. It weighs 42 lbs. including propellant and delivers 250 lbs. of thrust or about 100 horsepower for a duration of 15 seconds. Now in production, the rocket engine should be available this Fall, according to Rice.

The Gas Turbine Div. of General Electric (NBAA member) unveiled its aft-fan turboprop engine at lunch hosted by GE.

Prior to a press meeting with Senator A. S. Mike Monroney (D-Okla.), Clyde P. Barnett, director of the California Aeronautics Commission, hurriedly briefed the AWA members on the subject of diminishing airspace in California. Mid-air collisions are being set up consequently, Barnett said, by establishing limited airspace . . . by compressing the usable airspace.

He pointed out that there is a loss rate of 30,000 air acres per month in California.

This is a 180-degree switch by the military who originally said the setting up of restricted airspace areas was to benefit non-military flying, but it is now working the other way around. This is an accidental result, Barnett said, but it is happening.

Speaking at a dinner sponsored by the Air Transport Association, Senator Monroney outlined the Federal Aviation Act of 1958. (See SKYWAYS June issue report on the Monroney-Harris legislation).

The writers pressed the point of how the Agency will control Strategic Air Command operations on the airways. The Senator predicted SAC cooperation in this regard.

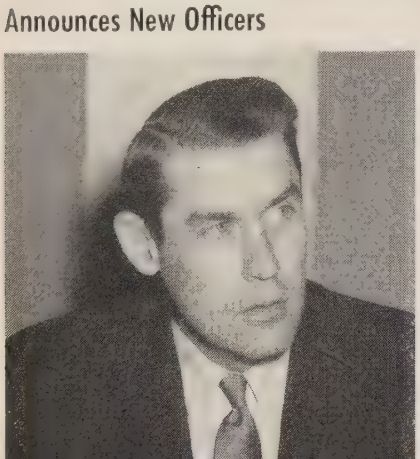
Departing from business aircraft for a day, your reporter joined the group flown to Carswell Air Force Base at Fort Worth in Lockheed turbo-prop giant Hercules. Breakfast was served courtesy of Douglas Aircraft Co. at the Houston International Airport.

Maj. Gen. J. D. "Smokey" Caldara spoke dynamically on flight safety at

(Continued on page 45)

Helicopters for Business

American Helicopter Society Announces New Officers



NEW PRESIDENT *of American Helicopter Society, is Charles H. Kaman, president and director of Kaman Aircraft Corp., who succeeds Don R. Berlin, president and board chairman of Vertol Aircraft Corp.*

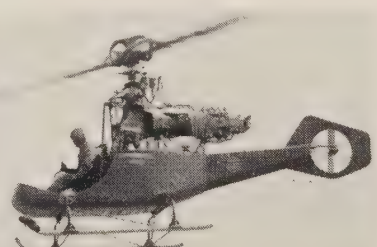
Harry Lounsbury, executive secretary of the American Helicopter Society, announced the election of Charles H. Kaman, founder and president of the Kaman Aircraft Corp. as president of the Society, to serve with the following members: Donald Thompson, Chief, Engineering and Development Branch, Army Aviation Div., Office of Chief of Transportation, as treasurer; and Leon L. Douglas, vice-president-Engineering, Vertol Aircraft Corp., as secretary. Mr. Lounsbury also announced these regional vice presidents: Michael J. Theodore, Sikorsky Aircraft (NE); Newton O. Brantly, Brantly Helicopters (Mid-E); George W. Fey, Sikorsky Aircraft (SE); John E. Leonard, Cessna Aircraft (Mid-W); Elton J. Smith, Bell Helicopter (SW); and, Paul C. Thornbury, CAA (W).

The 5th Annual Western Forum of the Society will take place at the Ambassador Hotel, Los Angeles, September 25-27.

Kaman K-17 "Cold Cycle Jet" Flies

Kaman Aircraft Corporation flies its new "Cold Cycle Pressure Jet" helicopter. Designed for low cost operation, officials of the Kaman Aircraft Corp. point out its good commercial possibilities that may be effectively used: to serve crop-dusting farmers; power companies for checking lines; short-haul taxi service for private executives or other company personnel. One feature is the payload can be greater for a given amount of power because they are lighter. The K-17 is powered by a Blackburn Turmo 600 gas turbine of 400 hp, driving a Boeing compressor located in the fuselage. Air from the compressor is ducted through a rotating seal to the rotor hub and out through the blades to jet nozzles at the rotor blade tips. The compressed air being expelled from the nozzles drives the rotor. This simplified system eliminates the transmission and clutch found in conventional type helicopters.

The small tail rotor is a fixed pitch propeller used for steering only. Driven by a hydraulic pump, the tail rotor, actuated by pilot's rudder pedals, is used for steering only, as it reverses direction of rotation. This produces the thrust for turning helicopter.



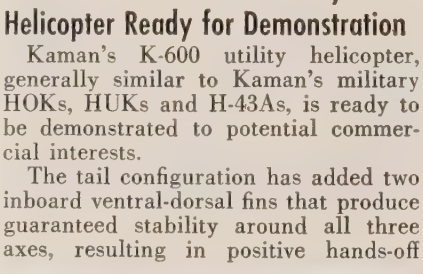
KAMAN K-17 *in flight with its tail stationary. Tail rotor, actuated by pilot's rudder pedals, is used for steering only. It is a fixed pitch propeller which rotates in both directions to produce left-hand and right-hand turns.*

Kaman Aircraft's K-600 Utility Helicopter Ready for Demonstration

Kaman's K-600 utility helicopter, generally similar to Kaman's military HOKs, HUKs and H-43As, is ready to be demonstrated to potential commercial interests.

The tail configuration has added two inboard ventral-dorsal fins that produce guaranteed stability around all three axes, resulting in positive hands-off flight characteristics in all normal flight regimes.

The K-600 is equipped with Kaman's new in-flight tracking device which permits the pilot to adjust the track of his rotor blades under all flight conditions.



KAMAN K-600 *Utility helicopter is ready to demonstrate stability around 3 axes.*

OKANAGAN HELICOPTERS, *world's largest commercial helicopter operator, adds four more Bell 47G-2s to its fleet of more than 50 rotary-wing aircraft, shown here leaving Bell's Ft. Worth plant for Vancouver, British Columbia.*

Stainless Steel Strip Shields Plastic Fiberglass Blades

A strip of stainless steel, thinner than the proverbial dime, is being used to shield the leading edge of plastic helicopter blades against abrasion damage from dust and particles stirred up by "whirlybirds" during take-off. Since the significant factor in design is weight, high tensile properties of stainless steel permit the use of extremely thin sections to reduce weight with no sacrifice of strength.

An innovation in helicopter design, the plastic blade is produced in two models by the Aircraft Division of Parsons Corp., Traverse City, Mich., called "Monolastic," an all-plastic blade made of fiberglass reinforced Plaskon polyester resin, molded in a single piece, and "Steelastic," a steel spar version.

Shielding the plastic fiberglass body of the blade from abrasion, the stainless steel strips overcome a problem equally troublesome to designers of other helicopter blades and propellers for conventional aircraft. The strips come from Republic Steel Corp., whose metallurgists recommend Type 302 chrome-nickel stainless steel.

An advantage of this type sheathing is corrosion resistance. It overcomes a problem caused by exposure to varied climatic conditions where the helicopter will work. Even a slight rusting or pitting in metal sections could upset the closely matched balance of sets of blades and create dangerous vibrations in the rotors. Another advantage is production engineers claim that uniformity

of Republic's stainless steel strip simplifies balancing the blades.

THE DARE MICRO *Tuner Omni Control Panel occupies a convenient and prominent place in the pedestal of the first jet helicopter, the Republic Alouette. Pretty Joan Mahur points it out.*

Propose Lobbyist Study

Richard D. Eccles, vice-president of Stockton Helicopters in Stockton, Calif., president of the Helicopter Association of America, said a committee of operators will study the proposal to hire a full-time executive secretary who would push the legislative interests of the Association.

The world's first CAA commercial helicopter certification was granted to a Bell helicopter in 1946. Since then operations have sprung up over the entire globe.

Operators in this country dispatch their ships to all continents to perform varied tasks, and some difficult, such as: offshore oil missions, mapping and surveying and mineral exploration.

Production Expert Joins Republic's Helicopter Unit

Fred O. Draper, veteran production and procurement supervisor, joins the staff of Republic Aviation Corporation's Helicopter Division in that capacity. In his new position, Draper will be responsible for coordinating all assembly and vendor procurement for the Alouette II, jet-powered helicopter.

British Copter Taxi At Brussels

A Westland Widgeon, 5-place, all-purpose helicopter, is being used for sight-seeing and charter flights at Brussels International Exhibition. Powerplant is Alvis Leonides engine.

The copter, shown in its Belgian colors, is run by Sabena Airlines.

THE WORKING 'COPTER

"Please accept my sincere congratulations on your 'Helicopters for Business' department in SKYWAYS. Inauguration of this concentrated coverage is a very progressive step and does much to add to the general 'up-to-dateness' of the magazine . . ."—Don Mockler, director, Helicopter Council, AIA. Don pointed out to the Wash. Region Mass Transit Survey the obvious advantages of helibus express service over surface transit between airports and downtown.

Business Is Good

LEAPFROG IN A HELICOPTER—*Crewmen and Tellurometer hop fast and often to complete measurements in record time in Virginia.*

When Pilgrim Helicopter Services made its first flight in June 1957 from the National Airport, Washington, D.C., to 3rd and H sts., S.W., little did James B. Hichborn, president, realize how good business would develop. Rates then were $75 an hour or $1.25 a minute for two passengers.

Since then, they have affiliated with Gray Line, Inc., regarding sightseeing activity. Gray Line Agents sell helicopter tours for a commission. People from as far away as Spain and Argentina already purchased tickets in their homelands for a helicopter sightseeing tour over Washington.

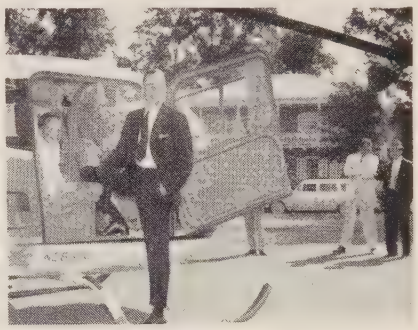
Since last year, Pilgrim has carried 1,374 passengers on 585 sightseeing tours. In addition, they made 110 charter or helicab flights, carrying 240 passengers.

On December 13, 1957, Pilgrim's business demanded another heliport at Virginia Ave. and 26th St., N.W., which was opened for study. The Business and Commerce Subcommittee, of the Senate, headed by Senator Beall, Republican of Maryland, urged the lawmakers to prepare now for booming metropolitan helicopter traffic of the future. Mr. Hichborn recommended developments of floating facilities as heliports rather than rooftop, because of safety hazards. The subcommittee was told that before long residents will hail helicopters in the same way they now hail taxicabs.

Realizing how time could be saved, a surveying crew in West Virginia used the three-place Bell 47H to ferry crewmen from point to point, with a Tellurometer, a new radar-like electronic measuring device. The crew completed the job in 12 days, one-tenth of the time normally required. Site of this unique "air lift" operation was down the 100-mile line of a proposed new interstate highway. Air Survey Corporation of Arlington, Va., was called in for the job and they immediately turned to Pilgrim Helicopter Services for aid. Each jump had to be carefully planned for success depended on keeping the men moving fast. Fast action of the Tellurometer in measuring the distance and the helicopter in transferring crewmen across valleys, hills and timberland made it possible for the work to be completed in record time.

Pilgrim Helicopter Services now has 7 employees in their organization, with hopes for a second ship early in the Fall, and prices have been reduced to $72 per hour, or less on contract.

Giant Textile Co Execs Have More Working Time in Pressure-Packed Day



J. SPENCER LOVE, *Burlington Industries' president, and his son, Martin, end Bell Helicopter trip at their front door in Greensboro, N.C. Burlington saves many travel hours for its major executives through use of their Bell Helicopter.*

Burlington Industries of Greensboro, N. C., with 30 plants within 100 air miles, saved nearly 600 hrs. of executive time the first 6 months their Bell 47J helicopter was used. This giant textile company's president, J. Spencer Love, firmly believes the actual working time of his executives is of paramount importance in these pressure-packed days.

The helicopter's ability to operate off the roof of the main office building in downtown Greensboro alone saves the 20-min. ride previously required to reach the airport for fixed-wing travel. Where autos cover the ground trip to Galax, Va., plant in four hrs., a helicopter takes only an hour and a half.

According to Burlington's management, the helicopter is paying high dividends in the elimination of many small drains on energy and brainpower, plus the fact that this faster transportation gets the man home to his family in time for dinner.

NAVICOM

RYAN C-W DOPPLER RADAR SYSTEM *for helicopters was demonstrated at the Aviation Writers Assn. meeting during a visit to Naval Air Station, Corpus Christi, Texas. Application of Doppler radar permits "zero-zero" operation of helicopters. Ryan Aeronautical, San Diego, Calif., pioneers in the field of Doppler systems for small aircraft applications, claims that their 30-lb AN/APN-97 continuous-wave system enables virtual "hands off" operations (which was demonstrated to AWA members by Sikorsky's HSS-1N), greatly facilitating cargo load pickups and delivery and emergency rescue work. Combined with auto-stabilizing equipment, it maintains the copter in hovering position automatically and the pilot merely monitors the operation by watching a single instrument (see arrow). Intersection of cross-lines at the center of the instrument (as with the familiar ILS indicator) indicates a hover.*

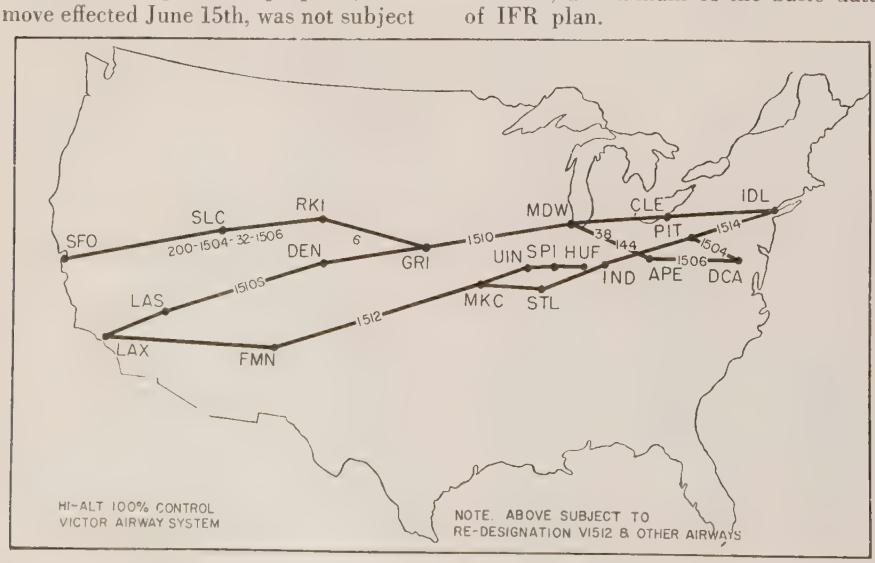
Circle No. 49 on Reader Service Card

ATC—Only Airway Date Advanced

In response to the public outcry following the latest airline collision, the CAB expanded the previous one-airway segment sampling of 100%-control techniques scheduled for sometime in July, to an extensive dual trans-continental set-up with spurs to Washington and San Francisco, but principally between New York and Los Angeles. A third shorter route connects Chicago and Washington.

Unlike the previous proposal, this move effected June 15th, was not subject to any pro and con discussion by the industry. Using the Capital Airlines crash as the spur, CAB summarily announced the move and although describing same as an "historic experiment" it flatly prohibited other than IFR-plan traffic from the respective airspace to be 30 miles wide and from 17,000 feet to 22,000 feet (previous proposal was 20-35000).

The rules for operating within, along or transit through the airspace involved are the same as previously announced, a minimum of the basic data of IFR plan.



ALPA for Extension of "Golden Triangle"

Following closely on the latest mid-air collision involving airline aircraft (Capital vs ANG T-33), the ALPA (Airline Pilots Association) has come out forcefully for extension of the now one year old "Golden Triangle" experiment in which their members have voluntarily operated IFR rules regardless of weather when above 9500 feet and in an area bounded by Boston, Chicago and Washington. Calling the past year's experience "very successful", Clarence N. Sayen, ALPA President urged that it be expanded to a triangle encompassing Boston to Key West to Chicago to Boston, and also all airspace in the Western Defense Area (in the latter case above 11,500 feet), starting date July 15.

Commenting that best results would obviously be obtained if all users of the airspace (military and general aviation) cooperated, Sayen nevertheless pointed out that anti-collision device research should be continued. He also urged full industry support for the Federal Aviation Agency Bill now before Congress placing all airspace and allocation under one head, the Monroney-Harris legistlation.

As presently presented, the bill provides for:

An independent Federal Aviation Agency directly responsible to the President and Congress, under a civilian head.

The FAA would regulate the use of all airspace by all aircraft and operate a unified system of air traffic control.

It would assume the current activities of the CAA and the AMB which is helping to establish the guidelines of FAA.

It would take over from the CAB its present promulgation and enforcement of Civil Air Regulations, leaving the Board its responsibility for economic regulations (especially the aircarriers) and accident investigation.

(In the latter category, the Board could call on the President to appoint special boards of inquiry to investigate major accidents.)

A special military adviser would be made available to the FAA by appointment of the Sect'y of Defense to coordinate special airspace problems of the military.

The time table for establishment of the foregoing has been speeded up under the impetus of the latest mid-air collision and enactment should precede the original date of the end of the year.

Meanwhile, the Presidential action in imposing IFR plan-type requirements of ATC, etc. on all military jet flights operating in non-restricted airspace is a first step.

After 20 Years—CAA

There is every indication that the 20th year anniversary celebration of CAA may well be transformed into a

"wake." Certainly within the organization, it has been no secret that expectations were that by 1963, the CAA would have been replaced by the independent all-inclusive Federal Aviation Agency, along the lines being planned by the AMB and the Monroney-Harris Bill in Congress. Although there are the usual areas in every public body where incumbent personnel fear for their tenure, a clear majority of the personnel and positions in CAA are of such a highly technical and vital professional nature, it should follow quite naturally that no change of bureaucratic structure could possibly eliminate the valuable functions they perform.

Although most of the industry and flying public are reasonably familiar with the basic air traffic control, licensing and airworthiness functions of CAA, there are other phases without which the airway structure of the nation would be tenuous indeed. Like ATC, these functions will only become more important to safety as the possibility looms that the FAA, under public pressure following the spectacular airline crashes, will take over from CAA sometime in the coming year.

"Jump-seat" riding on scheduled airline flights by CAA Air Safety Division agents of the Air Carrier Division

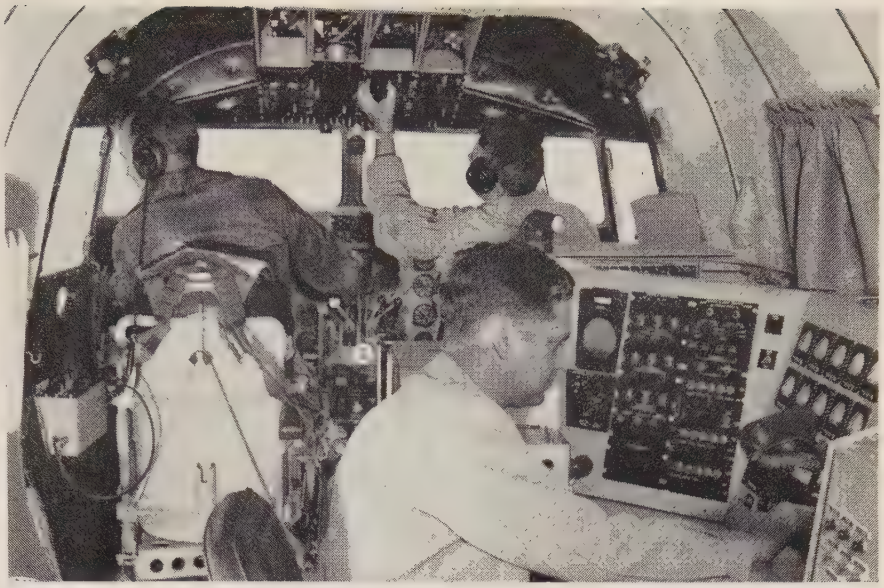
is one means the CAA uses to insure that approved procedures are followed and the general all-around competence of the operation is up to the standards necessary to insure safety of the flying public.

These agents may board an airline flight with or without prior knowledge of the crew (but usually coordinated with company for space reasons).

"ASDO agents," as they are known, for general aviation may only ride with a personal or corporation pilot at their request but time permitting some are accepting the invitation of such pilots to "jump-seat" and offer friendly and informal critiques.

The airway navigational facilities by which we fly are more than just a network of routes and aerial sign posts. They are a vast structure of highly complex electronic apparatus in which any mal-function at a critical moment, as in bad weather, can mean a catastrophe.

To insure that the operational condition of these facilities is such that the flying public can safely rely on them, is the chore of the Airways Flight Inspection staff. Until recently, using

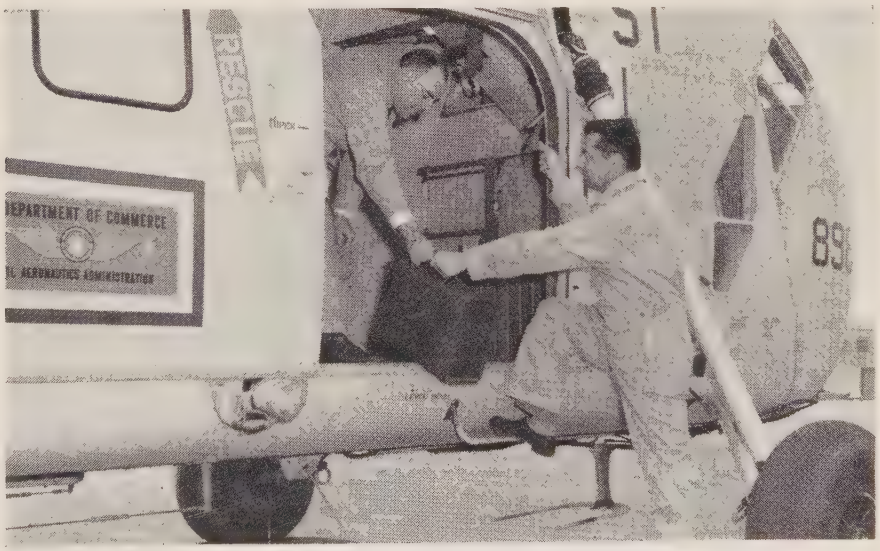


obsolete aircraft, the pilots criss-cross the country continuously checking and re-checking the accuracy of VOR's, LF ranges, ILS, GCA and other aids. A little known part of their job is checking new facilities and ATC procedures, before commissioning, to insure safety.

The photo shows the interior of one of the newer aircraft recently acquired to enable Flight Inspectors to do their jobs at a pace commensurate with the latest state of the art. Their equipment automatically records the signals received for subsequent ground analysis.

business has not been lost on CAA. Long before the instrumentation and control stabilization developments being announced today, the CAA set up its Helicopter Instrument Program (HIP).

The photo shows Harry Bernard, Chief Project Officer, aboard the Sikorsky S-55 loaned by the Navy receiving his equipment case from his colleague Bill Placek. The program is designed to develop IFR procedures for 'copters and analyze the problems involved in utilizing existing instrument facilities and airports.



Different types of aircraft are used for varying operational levels as surface to 10,000 feet, 10,000 to 20,000 feet pressurized and from 20 to 50,000 feet via B-47 (CAA operated) jet.

The growing use and fast development of the helicopter as a practical and valuable tool of air commerce and

Of special concern are procedures related to: minimum enroute altitudes; weather minimums (ceiling and visibility); adaptability to current let-down aids; establishment of new let-down practices; mixing fixed-wing and helicopter traffic; problems of high-wind conditions; and airman standards.

Ultra-light Low Cost Radio Compass

Personal business pilots flying the lighter aircraft will welcome the announcement of a new radio compass just placed upon the market called the "Bird Dog RDF-2 Radio Compass." It weighs only 9.14 pounds and is manufactured by Aircraft Specialty Lines, Inc.

Highly compact, it includes the following components: an 8 tube superheterodyne tuner, measuring 12 x $6\frac{9}{32}$ x $2\frac{27}{32}$ inches; vibrator-type power sup-

(Continued on page 46)

CANADIAN REPORT

North of the Border
By R. J. Childerhose

ALBERTA FLYING FARMER OF THE YEAR *award is presented to Varno Westersund, left, of Blackie, Alberta, by Roy T. Moore, Western Sales Manager for Trans Aircraft Co. Westersund's farm is located approximately 25 miles southwest of Calgary, and has both north-south and east-west runways of 2,000 feet in length. Westersund, president of the Alberta Flying Farmers, was presented the trophy for his efforts in coordination and progress of the Association. The trophy was donated by Piper Aircraft Corp. and the Canadian Distributors, Trans Aircraft Co.*

Commander 680 for Survey

Commander Aviation Ltd., of Gananoque, Ont., distributor for Aero Commander aircraft in eastern Canada, has recently leased an Aero Commander 680 to the Department of Mines and Technical Surveys. The executive-type aircraft is to be used on an airborne magnetometer survey project in the Maritimes under Decca control.

After installation of Decca navigational equipment, the Aero Commander will be operated for the Department by crews of Spartan Air Services Ltd., Ottawa. Conversion for survey work of the aircraft was done by Spartan. Modifications included installation of tail boom magnetometer. Decca gear, radio altimeter and a cabin lined with electronic gear.

The most striking of these modifications is the tail boom magnetometer. The existing tail cone was cut, reinforced and fitted with a metal housing for the survey instrument. A sensitive bulb completes the installation. The magnetometer is used in direct exploration for ferrous type minerals, (iron, nickel and titanium), indirectly to locate oil, and to gain general knowledge of structural geology.

Plans call for the Aero Commander to fly more than 700 hours this summer covering more than 110,000 line miles with the magnetometer and aerial camera. Main operating bases will be St. John and Moncton, New Brunswick; and Sydney and New Glasgow, Nova Scotia.

A British Mark 8 Decca navigation system was installed in the aircraft as an aid to accurate air survey navigation using the newly opened Quebec-Maritimes Decca chain. The Decca system employs groups of low frequency ground transmitting stations sharing a common master station. The system sets up stationary standing wave patterns whose intersections give precise navigational fixes to Decca receiver equipped aircraft flying within the pattern.

The Decca information is presented on four Decca dials and the characteristic Decca map and pen set-up. The Decca dials in the Commander will be continuously photographed by a 16 mm recording camera for future use.

Other flight aids incorporated in the aircraft are: Sperry Gyrosyn C-4 compass, high frequency Hamlyn HTR-10 communications radio, dual ARC-21 radio compasses, a Narco Sapphire VHF radio, and an APN-1 radio altimeter. In addition, an Aeropath continuous strip film camera shoots through a hole in the cabin floor recording the flight path on film.

The program to be handled this year by the Aero Commander was flown for 8 previous years in a Canso aircraft, operated by Spartan crews. The Canso was much larger and slower than the Commander and this year's program is in the line of an experiment at cutting costs with a smaller and faster aircraft, a smaller crew and easier maintenance.

Wolf Hunting From The Air

Ontario Lands & Forests Department officials in Kenora report that wolf hunting from aircraft is still one of the most popular winter sports in that part of the province. The annual kill has remained fairly stable over the past five years.

The largest number presented for bounty was 301 in the winter of 1956-57. Of these, 183 were killed from aircraft. The game is to catch a wolf, or a wolf pack, out in the open. While one man flies the aircraft, the other handles a rifle out of the open window. Wolves caught out on the middle of a lake by a pair of hunters in a light aircraft usually fall easy prey.

The average yearly bounty paid in the past five years for wolves was $6,065.

Names Make News

Two senior appointments in the Telecommunications Branch of the DoT are Mr. C. M. Brant, promoted to Chief of Technical Co-ordination, and Mr. W. A. Caton, to controller of Radio Regulations.

Retirement of Frank L. Tretheway is announced by Orenda Engines Ltd. where he was vice president, sales-service. His career started with deHavilland of Canada.

G. W. "Geof" Northcott has joined Spartan Air Services Ltd., as chief of pilot training and standardization of flying procedures.

Kenneth F. Saunders, DSC, AFC, retired from his position as Regional Superintendent of Air Regulations, DoT, at Edmonton, Alberta.

A. J. Johnson has been named as general manager of Timmins Aviation (Terminals) Ltd., Montreal Airport.

Aircraft Salvage Company

A new company specializing in the survey of damaged aircraft for insurance companies and owners, as well as salvage of damaged aircraft, has been formed in Vancouver. Known as Far West Aircraft Salvage & Survey Limited, it is headed by Dennis McCartney, who has been named president.

Homebuilders Kit for Canada

A recently formed company, Maranda Aircraft Regd., Montreal, is marketing a series of kit aircraft for Canadian home-builder fans. Headed by Bernard C. Maranda, president, the company has obtained sole Canadian and foreign rights to manufacture the French-designed prefabricated kits for the RA-14BM1 "LOISIRS"; the RA-15BM2, and the RA-17BM3, all of which are light, high-wing monoplanes.

Manufacturing and selling rights for kits or complete aircraft, for Western Canada only, have been granted to Falconar Aircraft Maintenance, Edmonton.

Representatives of the three types for which Maranda has obtained rights is the RA-14BM1, a two-seat light cabin strut-braced monoplane with folding wings. It can be powered by any engine in the 40-65 hp range, with the 65 hp Continental being a popular choice. With this engine the following performance is obtainable: max speed 87 mph; landing speed 31 mph; ceiling 13,120 feet; range 280 miles; take-off 109 yards; landing run 66 yards.

There are two kits available for this particular aircraft, these differing in that one contains many parts and components ready for assembly, while the other one is made up mainly of cut-to-size materials which must be fabricated into such items as ribs, etc. The latter kit, known as Kit No. 1, less engine, is priced at $1,600 plus $50 for crating.

The more elaborate Kit No. 2, containing finished ribs, spars and tips for wings and tail, and completed fuselage frame and engine mounts, costs $2,420 (less engine) plus $150 for crating. A completed airframe less engine can be obtained for $3,500 plus $200 for crating. A finished aircraft with 65 hp Continental costs $4,600. All prices quoted are FOB Montreal.

Additional details concerning the RA-14BM1 or the other two types mentioned may be obtained from Maranda Aircraft Regd., 8375 Baillage St., Montreal 5, Que.

Otter Fire-Fighter Sold

The New York State Forest Conservation Department has purchased a Canadian designed and built deHavilland Otter for use in fighting forest fires caused by lightning in remote areas.

For this application the Otter was fitted with the rapid-load, rapid-dump tanks which are mounted on the floats. These tanks were developed and successfully tested by the Ontario Department of Lands and Forests in 1957. In addition to the water dropping chore, the Otter will transport fully-equipped eight-man fire fighting units to isolated fire sites.

The tanks are filled by means of scoops positioned between the floats as the aircraft skims across the water. Total time for a filling operation from touchdown empty to takeoff full is 18 seconds. Three-quarters of a ton of water is dumped in a single drop. Operating from a lake situated one mile from the fire site, a single Otter can dump 14 tons of water in an hour.

While the delivery of the greatest amount of water in the shortest possible time was the prime target of the development of the float tanks, there are other features of this technique that add to its superiority over all previously tried methods.

The entire operation is conducted by the pilot without assistance, and the equipment can be used in conjunction with other control measures without danger to the fire fighters. The tank equipment does not interfere with the normal operation of the aircraft, and only fractionally reduces its loadcarrying capacity.

This means that it can continue its functions of transporting men, equipment and supplies to fire sites, carry out patrol and evacuation missions and still be instantly ready for water-dropping operations. If necessary, the tanks and scoops, (total weight 170 pounds), can be carried in the cabin. Two men can complete reinstallation in ten minutes.

Royal Gull Gets New Owner

Eastern Provincial Airways, of Gander, Newfoundland, has bought the Royal Gull demonstrator belonging to Timmins Aviation Ltd.

The company expects to utilize their new aircraft at least 1,000 hours per year. It will be flown in a three fold role: ambulance work, mail carrier and executive passenger service.

The purchase marks Eastern's first venture into the twin-amphibian class. The company's activities vary from flying seal hunters to rescue and mercy missions. The Gull will be operated under the most severe flying conditions along the rugged Newfoundland and Labrador coast.

(Behind the Gull in the photo is a deHavilland Dove.)

Fish Planting in Ontario

Aircraft were used this year to speed up spring planting of yearling fish in the myriad trout lakes in Ontario. In less than two hours, fish are transported from hatcheries, transferred to Ontario Department of Lands and Forests planes equipped with oxygen, and dropped into lakes in a shower of spray.

According to K. K. Irizawa of the Department's Pembroke staff: "The success of a planting depends largely upon the pilot, the weather and the limitations of the aircraft used. When a strong wind is blowing, there is danger that the relatively light load will be blown to shore before reaching the water. This is especially true when the planting is in one of the smaller lakes situated in a hollow with hills all around.

"If the fish are dropped from too high, more than 800 feet, the mortality rate jumps excessively. This is apparently due to the time lapse which may allow the fish to dry out during the long fall. The other factor is that the aircraft is travelling at a considerably greater speed than that of the fish when they are falling free. Therefore the drop must be made from sufficient altitude to allow the fish to slow down to normal falling speed before striking the water."

New Company Formed

Tim-Com Engineering Limited, a complete aviation electronics sales and service organization, has been formed at Montreal's Dorval Airport. The new company has been organized to plan, install, test and service any type of electronic system in any aircraft.

President is R. D. Quart, P. Eng. Mr. John A. Timmins has been named vice-president; Ian V. Meller, P. Eng., as service manager; and Donald M. Martin, P. Eng., as sales manager.

The facilities of Tim-Com Engineering are capable of executing any assignment from the replacement of a radio tube to the complete installation of a weather radar system. The company is also prepared to plan, supply, install and maintain ground-to-air and ground-to-ground communications, involving both portable and high power equipment. All work is done in accordance with DoT regulations.

Personnel Licences

The number of pilot licences of all types in force in Canada at the end of March 1958, showed a decrease of 14 over the total in force at the end of 1957.

The greatest change was under the private pilot category. Of a total of 7,832 at the end of 1957, there is now a total of 7,796.

Commercial licences dropped 12 from 2,411 at the end of the year to 2,399; senior commercial from 399 to 374. Airline transport licences showed a healthy increase from 968 to 999. Glider pilots in Canada have increased by 4 to a total of 291 as of March 31.

BANK INDEX
VERTICAL PATH REFERENCE
ATTITUDE REFERENCE
HEADING INDEX
LATERAL COMMAND
PITCH COMMAND
HDG SET
GYRO
LUBBER LINE
GLIDE SLOPE DEVIATION
AIRCRAFT REFERENCE
SELECTED COURSE INDEX
COURSE DISPLACEMENT BAR
RECIPROCAL INDEX
SET
GYRO
LOC

You'll love LIFE* even more—

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MEETS ALL TSO REQUIREMENTS FOR AIRLINE OPERATION

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THE SUPERIOR SATELLITE

by Charles Roberts

The enthusiastic clamor caused by the 4-5 place, single and light-twin business aircraft has almost drowned out the voice of the smaller business pilot who is not flying because of the lack of a new, modern, good performing 2-place airplane. On a business trip with chartcase and overnight bag for company, 3-4 empty seats are difficult to justify, plus the proportionately greater initial and upkeep costs. Because there are numerous non-flying pilots who could use airplanes, Skyways feels that the following report can give encouragement to many small businesses needing aircraft.

Arriving at the Hawthorne, Calif., Airport to make a check flight of Superior Aircraft Co.'s new "Satellite," I spotted the craft as it entered the traffic pattern. As the low wing, tricycle-geared ship rolled up the runway, I was impressed with the wide spacing of the landing gear and the sturdy appearance of the cantilever wing with up-turned tips.

Bob Hunt, chief pilot of Superior, parked the plane and stepped out. I asked him to brief me on the outstanding features of the ship. He replied that the outstanding features would be more easily discerned in the air, but he'd oblige with the physical details.

We started at the front with the closely cowled engine installation and controllable prop. The cowling is retained with plain Dzus fasteners which, while a little slow operating, have the big advantage of being dependable and easily available if replacement is necessary. I commented that the cowl was of several pieces. Bob replied that while for performance close cowling is essential, the small sections make it easy to get to any part of the power plant for checking or maintenance without having to strip off the whole cowling. Weight and cost advantages were brought up as was less chance of fatigue cracks in the small sections when the ship has a lot of time on it.

The landing gear has "over center" lock links on the main and nose gear *in plain sight* where it is easy to check. Seals and most of the oleo parts are interchangeable in all struts for ease of maintenance. Dual landing lights are well out on the landing edge of the wing to avoid glare.

The increased dihedral of the wing tip contributes greatly to the stability of the ship in rough air. Large span slotted flaps and an all-moving stabilizer interconnected with the flaps, eliminates retrimming of the ship as the flaps are lowered.

The entire ship, with exception of the fabric-covered rudder, is of bonded and impregnated wood and plywood, giving smooth surfaces and low maintenance. After dipping to keep out moisture, the wood surfaces have a cellulose and fiber finish which has proved extremely good over long periods of weathering. In areas near the ocean, wood aircraft have been standing up even better than metal ships which often encounter serious corrosion problems even if painted. Bob made the point that the actual number of ships disabled by metal fatigue and corrosion greatly exceeds the number of wood aircraft damaged by deterioration.

A convenient handle just above the rear windows assists stepping from the ground to the wide wing walk provided on each side of the fuselage. Entry to the cockpit is via a unique windshield hinged along the front edge. It swings up and forward to give a really sizeable opening. This also gives access to the 6 cu-ft baggage compartment, rated at 60 lbs capacity, between the firewall and the instrument panel. Removal of the aft wall (by means of a few screws) gives complete, convenient access to the rear of the instrument panel. A few more screws will allow the removal of the whole compartment giving access to the brakes and rudder control system. A real maintenance dream, this one!

It was a pleasant surprise to find unusually ample room for my 6-ft, 1-in frame in the 2-place cabin. The adjusting handle for the seat is located on the outboard side. It has three positions. With the windshield closed the head room was really noticeable, no need to slouch or bend over to look out the windows.

Cockpit layout is simple and convenient. Engine controls are grouped on a console below the center of the instrument panel. Master switch, parking brake and starter are conveniently at the base of the console just below space for the radio installation. There are dual rudder pedals and sticks with toe brakes on the left. The landing gear retraction switch is on the instrument panel in front of the pilot and under a bright red guard, completely away from other switches, to prevent accidents.

Nose wheel steering is provided, linked to the rudder pedals, giving positive control even at high taxi speeds. The ground can be seen a few feet in front of the ship.

There was no swerving tendency on takeoff even though the throttle was opened quite rapidly. At 65 mph, a little back pressure lifted the ship off neatly after an 800-ft run. For best performance climbing airspeed should be just below 80 mph. Gear retraction time is six seconds. With power reduced to climb settings we were getting 500 to 700 fpm at gross weight of 1600 lbs.

At 2,000 feet, I lowered the nose, shifted the prop to high pitch and trimmed the ship. Airspeed climbed to 125. Despite the noticeably small ailerons, the rate of roll is phenomenal for a personal type airplane.

Some stalls followed, both power on and off, gear and flaps up and down. In no case can a stall in the true sense be achieved. The ship retains excellent rudder and aileron control throughout and in most configurations just sits in a controlled, nose high "mush" until the

(Continued on page 43)

SAFETY DIGEST

RICHARD W. GROUX, *Assistant to Executive Director NBAA*

Compiled and edited from leading air safety publications issued by military, naval, airline, government agencies and from private and business pilots' experiences.

Cockpit Air Contamination

While much attention has been given to carbon monoxide poisoning in the recent past, CO is by no means the only hazard to guard against. There are other toxic agents which are equally as dangerous—vapors of fuel, hydraulic fluid, coolant fluid and fire extinguisher chemicals.

Gasoline vapors are heavier than air and are readily absorbed by the lungs. They are poisonous in concentrations far lower than that required to cause fire or explosion. If the concentration is high, symptoms may appear after only a few minutes of exposure. Slight exposure causes dizziness, nausea and headache. These are the primary symptoms for most of the inhaled poisons discussed here.

Acute poisoning is marked by burning, watering eyes, restlessness, excitement, disorientation, disorders of speech, vision and hearing; and in excess, convulsions, coma and death.

In one commercial airline accident it was determined that the 25 passengers who remained in the aircraft died from exposure to gasoline vapor, possibly within five minutes. The evaporation of 28 gallons of gasoline would result in a vapor concentration of 20 percent which would be lethal in a few minutes.

This hazard may be present along with the fire and explosion hazard at any aircraft accident where tanks are ruptured.

When oil escapes onto hot engine parts and fumes enter the cockpit, the pilot may experience symptoms similar to carbon monoxide poisoning, including headache, nausea and sometimes vomiting, in addition to irritation of the eyes, nose and throat.

Hydraulic fluid is in the same chemical family as engine oil. A small leak from a hydraulic pipe or gage under pressure may release a finely divided spray of hydraulic fluid which diffuses quickly throughout the cockpit. Some of the chemicals in hydraulic fluid are toxic when inhaled. The octyl and propyl alcohols, for example, are about 12 times as potent a narcotic as ethylalcohol (the drinking kind). They also irritate the eyes and lungs, cause headache and vertigo and actual impairment of judgment and vision.

Experimental animals have been killed in a few hours by exposure to air containing 3 mg per liter of hydraulic fluid. And that's not much—about the same as 1/100 of a standard-size aspirin in a quart.

Fire extinguishers can be lethal under certain circumstances. Within the aircraft itself there is the possibility of overconcentration of CO_2 (carbon dioxide) from discharging a portable fire extinguisher, even the little two-pound trigger model. If the fire is in clothing or upholstery, it might be wise to consider using your precious jug of coffee on it in a small cabin like a Beechcraft's—don't do this on electrical or flammable-liquid fires though! A carbon-tetrachloride extinguisher can produce toxic vapors when the carbon tet is vaporized by the fire you're trying to extinguish.

E . . . Is For Eating
E . . . Is For Efficiency

E is also for excellent, effort, eggs, eclairs, endocrine, enemy and emolument. But the first two items, Eating and Efficiency, are related more closely than any of the others. And especially so to you, oh skillful steersman of aerial steed. Eat you must, and efficient you must be, but the mere act of accomplishing one does not guarantee attainment of the other.

Your Eating for Efficiency can be divided into two main fields, and since not all aviators are affected by both, you might be one of those lucky ones who has only one to worry about.

The first concerns what you should eat to keep your energy and efficiency level from falling below the high standard that is demanded by your job. Until science finds how to extract enough energy from a quick cuppa coffee and a cigaret, everyone who whips through that kind of breakfast is playing Russian Roulette with himself and with the lives and safety of others.

The second field concerns what you shouldn't eat. Nosireebud, if you're out to prevent expansion of that equator area down around shirt button six, you've gotta expand your list of verbotens first.

The Egg and You

Let's say a pilot arose late, ate a hurried and completely inadequate breakfast of coffee and doughnuts, kissed his wife an inadequate peck on the cheek and rushed off to work.

By midmorning he was already anxiously awaiting lunch. He became more preoccupied with his state of hunger than with the task at hand—that of controlling an aircraft.

Aside from hunger (and more important to the medical men) his blood sugar level, not strongly enough fortified by an adequate morning meal, began slowly to deplete. The results were characterized by irritability, nervousness, easy fatigue and weakness.

According to a study by the Department of Agriculture, the consequences of low blood sugar (most significant in aviation) include delayed responses, which are themselves often incorrect or inappropriate, and profound impairment of rationality, reasoning and intellectual ability.

Eating a light, inadequate breakfast, or no breakfast at all, low blood sugar ("relative hypoglycemia" says Doc) will render any problem or stressful situation less tolerable and more difficult to cope with.

In this condition, problems which require split-second decisions are less likely to be met with a correct solution or response.

What constitutes a common, but inadequate, breakfast as related to low blood sugar? It was found that no breakfast or a cup of black coffee alone resulted in no rise of blood sugar above that of the fasting state.

With the inclusion of sugar, toast or a doughnut however, a rapid but transient rise in blood sugar occurred, followed by a rapid decline to a low level. This in turn resulted in inefficiency, fatigue, weakness, headache and lack of coordination.

Reason for this decline is that the carbohydrate from doughnuts, sugar . . ., is digested almost immediately. Sugar floods the blood stream and insulin is overproduced. This in turn causes a dangerous drop in blood sugar.

Now this is where that one, lone egg enters the picture. The inclusion of protein, whether it be in the form of eggs, bacon, cereal, or milk, will fulfill the requirement for optimum blood sugar levels.

Protein regulates and slows the production of sugar so that a steady supply is provided throughout the morning. There is no doubt that well-being and efficiency during the morning hours depends upon the amount of protein eaten at breakfast.

A survey conducted at an Air Force base among student pilots discovered that as many as 50 percent went flying without a proper breakfast. At the same time, the unexplained accident rate for the command was far too high.

With the information at hand, an "eat your breakfast" campaign got underway. When the pilots began to consume an adequate morning meal the accident rate of the command fell to the lowest on record.

Gulping a cup of coffee and quickly devouring a doughnut might be the expedient thing when you're getting a late start in the morning, but it's hardly the wisest thing to do. Far wiser is he

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no advances the alarm clock the night fore to allow time for a full, proper iator's breakfast.

If you don't eat enough of the right ings, your blood sugar level will drop ngerously low. You'll become nerv- s, irritable, weak. By eating just one g you'll be able to maintain that all portant level—you might save your vn life, and others as well, and an air- ane, too.

Not scheduled to fly? Have that egg ayway—you'll make friends when you ange from a nervous, irritable rooge to a kind, benign signer of ecial liberty chits.

Are you convinced that you need a od hearty breakfast before launching to the murky blue? Well, now that ou've had your eggs over easy, let's ep to another very related facet of this ry enjoyable eating business—what ou shouldn't eat.

Overweight Kills More People Every Year Than Cancer

Now that's a pretty strong statement o make, but we'll proceed to justify it nd tell you a few things about over- eight.

First off, when you're carrying a igher gross on your frame, you have o use more power to get around. Just ike airplanes.

Second, all that extra blubber needs o be fed from your blood stream, and ushing more blood around through nore channels puts an additional load n the old pump.

Third, all your excess tonnage isn't ecessarily sitting out there behind the elt buckle, in plain view of God and Man. No, there's a substantial amount loating around loose in your blood, as iny droplets.

These are the little rascals that really aise havoc with the system. There is a growing body of medical evidence to prove that these promote the deposit of a fatty sort of scale on the inside of blood vessels which narrows them down, hardens the walls and in general decreases the amount of blood available to the tissues.

The place where this really hurts is in the heart. This is the first stage in the type of heart disease which leads to heart attacks, and people who are overweight are far more susceptible to heart disease than other types. And heart disease is our number one killer.

Overweight hurts you in other ways, not to mention appearance. Because of all the extra load on your heart, it saps your energy. You tire easily.

Just to mention a few others, high blood pressure occurs more often in people who are fat, as does diabetes and gall bladder disease. And if you ever come up for surgery of any sort, any surgeon will tell you he considers an overweight patient a poorer risk than one who is "in shape." Are you sold yet?

Which brings up the subject of—(ugh)—diets. Let's face it, there is no easy way to lose weight, no magic pill nor hormone. In order to do it, you must first make the sincere confession "I'm overweight because I eat just too dog-gone much." In fact 99.99% of all people who are overweight are that way because of simple overeating. When you take on more fuel than you burn, the rest of it turns to fat. The way to diet, though, is *NOT* to cut down to one meal a day. It's important that you eat three meals, but never a big meal, and never a snack between.

Even though we're talking about eating, what about *alcohol??* Besides impairing your efficiency directly, alcohol is loaded with calories—(the distillers are still working hard on creating a no-cal booze, but no target date has been set). *General rule of thumb: an ounce of grog has about the same number of calories as its proof.*

The time to start is right now. If you're on the coffee-and-a-kiss breakfast, keep the existing ingredients, but add that all-important protein-providing egg. (If time is critical, we recommend you skip the coffee rather than the kiss; the coffee contributes little, but even the standard hasty smooch sends you off to work with a lighter, gayer step).

And if you're the Fat Man whom everybody loves, except your friendly flight surgeon, see him now and he'll almost guarantee that (with your cooperation) it will take a lot less sand to cover you up on the beach this summer.

'Scuse us, it's time for our creamed lobster salad! (Approach USN)

Tower of Babble

The Beech was just turning onto final, gear down, flaps 30, props full forward, when the tower said, "Hold clear, nine."

"Hold clear (?) Guess he wants us to wave off," grumbled the pilot, "okay, dump the flaps," and he reached for the throttles. A moment later the air in the cockpit was blue with four-letter words as the pilot lunged for the flap lever and raised them from the 45-degree-down position that the copilot had placed them in.

"What in $\#\%@\#$? did you lower the flaps for? I said to *dump* the flaps, don't you know that means to get rid of 'em?"

Before the nervously shaken copilot could reply the tower called to ask why they had taken a waveoff. In a few more explanatory transmissions it developed that the tower's "Hold clear, nine" was intended for a Convair holding off the runway—seems he was starting to inch up onto the runway. Yep, both the Beech and the Convair were number nine.

The mythical Tower of Babel had nothing on this situation, nor on many other similar situations that take place in aviation nearly every flying day. The confusion that exists in cockpits, in control towers and on the line is astounding—and it's astounding that more accidents don't happen because of wrong or non-standard terminology and signals.

The confusion in the above case originated in the tower, but towers aren't the only source of conflicting words and instructions that can end in disaster. In fact, it's often no words rather than words that create a hazardous situation.

There are three underlying causes for the misinterpretations that arise out of situations like the one described above.

First is the English language which is littered with pitfalls in its written and spoken forms. Even under ideal conditions "go" can sound like "no"; and "gear" sounds like "clear," "prop" can be interpreted as "stop."

Second bugaboo, mathematical probability, says that if you say "nine" around a busy airfield often enough, there's bound to come a time when two nines will answer up.

And the third offender, the only correctable one, is people. Ever since "Hell's Angels," a great preponderance of the people who work in, on or around airplanes seem to talk the terse, grade-B movie "flying talk." It's a normal, human trait that you can't blame people for, to talk the "jargon of the trade."

But individuality makes us invent our own jargon, and some of it just doesn't get around to the right people until panic button time. Now there's one—Panic Button—bet you can find a lad who'll look all over the cockpit for one.

Well, what would YOU do if you had half flaps and your pilot told you to "Dump 'em?" The copilot in this story had heard the phrase before, but to him "dump" was synonymous with "down and "lower." His pilot insisted that "dump" meant the same as "jettison," "get rid of," "do away with," "spill."

You can probably think of several pet phrases right now that are perfectly clear to your crew, but what about the young lad who just offered to be a "warm body" for you so you could run a Beech up to Norfolk or North Island for some parts? Never flew with you before, but this is daylight VFR and he's just sitting there to run the wobble pump, . . . and then you make that backward motion over the throttles as you go to raise the wheels, so he'll ease off to 30" for you. Oh, you didn't think he'd pull them all the way back on you? Well, there's a pilot who now touches up the gray hair that was brought about by a lad who did just that.

One of our pet peeves turned into a near-accident not long ago—we grumble and growl when towers ask us to "expedite this" and "expedite that" because we like to expedite through the clear blue air, but we rebel at being rushed into a hasty ground check or takeoff.

So, when the tower asked a lined-up aircraft to "expedite clearing the runway," they weren't sure whether they were supposed to hurry up and take off or hurry up and taxi back off the runway. The tower operator knew what he wanted, but the resultant dangerous confusion arose because the pilot responded with his own perfectly logical interpretation of "clearing the runway."

And then there was the many-thousands-of-hours pilot who saw that his student was going to fly right down into the runway, so he said "break it" . . . BREAK IT—NEVER MIND, I'VE GOT IT . . . #$%#$#%. Turned out the youngster was braking as hard as

(Continued on page 52)

NBAA Member Stars Again at Reading

FLAGSHIP OF U. S. INDUSTRIAL FLEET *is Super Ventura of National Distillers & Chemical Co. Harold Curtis holds trophy as company personnel look on. Plane is equipped with Bendix radar, FDR-1D; transmitters (2) TA-20; receivers (2) RA-18C; marker MK7-A. Collins Nav. Rec. 51-R3 (2); Glide path 51V-3 (2); HF system 185-4A; transponder. Sperry Autopilot SP-20; R-1 indicator; C5-B compass (2); engine analyser. A.R.C. audio system F-11; ADF ARC-21 (2). Pratt & Whitney 2800 engines, Firestone and Goodyear tires, cabin audio Hi-Fi system, cockpit monitoring system. Champion Spark Plugs are used. Radome (for all Howard Super Venturas) is by McMillan Industrial Corp. These equipment manufacturers are all NBAA members.*

Awards Presented At Ninth Annual Reading Maintenance-Ops Meeting

Taking top honors at the Reading, Pa., meeting was the National Distillers & Chemical Co.'s Super Ventura, piloted by Harold Curtis, "Flag Ship of the Industrial Fleet."

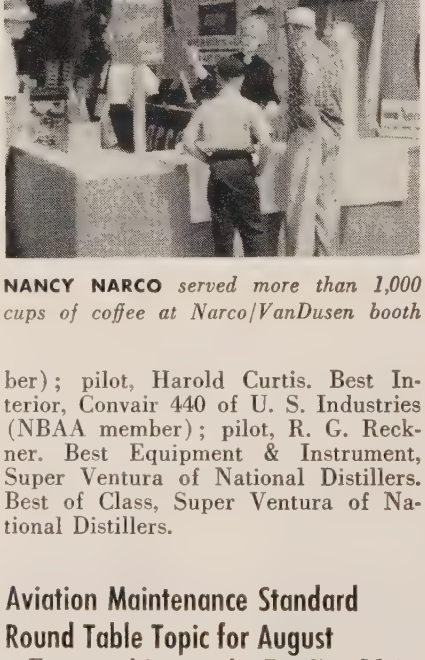
Other awards were: Antique Aircraft, Oldest Antique, 1928 Waco-10 of Robert Hoover. Best Restored antique, 1932 Waco UEC of John B. Stirling.

Single Engine: Best Exterior, Beechcraft G17 of J. J. Ryan; pilot, R. V. Brugh. Best Equipment & Instrument, Cessna 182 of Ed Chadderton. Best Interior, Helioplane of Laren Pitcairn. Best of Class, Chadderton's 182.

Twins Under 5,000 Pounds: Best Exterior, Cessna 310B of New York Wire Cloth Co. (NBAA member); pilot, Stanley Smith. Best Interior, PA 23 of Oval Wood Dish Co.; pilot, Burt Whitcomb. Best Equipment & Instrument, Cessna 310B of N.Y. Wire Cloth. Best of Class, Cessna 310B of Ed Chadderton; pilot, Joseph Buckwalter. Honorable mention for best of class, N.Y. Wire Cloth's 310.

Twins 5,000-12,000 Pounds: Best Exterior, Commander 520 of Summitville Tiles; pilot, Fred H. Johnson. Best Interior, Beechcraft D18 of Braund Plywood Inc.; pilot, Wm. M. Gunn. Best Equipment & Instrument, Commander 680 of Stackpole Carbon Co.; pilot, Richard Y. Cargill. Best of Class, Beechcraft D18S of Virginia Coal & Iron Co.; pilot, Chuck F. Sowa. Honorable Mention for Interior and Exterior, Beech D18S of C. L. McMahon. Honorable Mention for Equipment & Instrument, Beech D18 of Braund Plywood. Honorable Mention for Best Interior, Commander 520 of Summitville Tiles.

Twins over 12,000 Pounds: Best Exterior, Super Ventura of National Distillers & Chemical Co. (NBAA member); pilot, Harold Curtis. Best Interior, Convair 440 of U. S. Industries (NBAA member); pilot, R. G. Reckner. Best Equipment & Instrument, Super Ventura of National Distillers. Best of Class, Super Ventura of National Distillers.



NANCY NARCO *served more than 1,000 cups of coffee at Narco/VanDusen booth*

Aviation Maintenance Standard Round Table Topic for August

Forum subject at the Reading Maintenance and Operations Meeting was "Aviation Maintenance Standards." It resulted in a free-swinging, entirely uninhibited hangar flying session. Don't miss this interesting, topical discussion in August SKYWAYS.

Moderator is George Weitz, Deputy Chief, General Safety Div., CAA, Washington. Other panelists included T. D. Allegretti, Champion Spark Plug; A. E. Gossett, AC Spark Plug; E. P. Kovac, Lockheed Aircraft Service Internat'l; R. S. Scott, Airwork; K. E. Voelter, Gen'l Aviation Advisor, CAA; E. D. Kelley, Reading Aviation Service; A. E. Custer, No. Natural Gas.

Round Table

(Continued from page 21)

the industry as a whole. The airlines' jets will be using igniters instead of spark plugs. The general commercial aircraft market will continue to use spark plugs.

Kovac: Regarding money saved, if any, to overhaul spark plugs, we have found that it is possible to overhaul between 10-20 spark plugs an hour. A new spark plug costs about $2; we've concluded, therefore, that it is worthwhile to overhaul a spark plug.

Valve and Piston Burning

Campbell: Mr. Mecca, how do you folks do in that field?

Mecca: We have had considerable experience. I believe that we were the first in the field with a 91 octane high compression small engine. Besides spark plug fouling, we also experienced frequent valve and piston burning. The solution to the burning problem was two-fold. (1) Education of the operator on the use of the mixture control and (2) redesign of the manifold system for better lead distribution and better cooling of the combustion chamber principally through the use of a sodium-cooled free exhaust valve.

Other design features were also incorporated which protected the exhaust valve and valve seat from attack by the combustion by-products. The present family of helicopter engines is not sensitive to detonation as long as the proper grade of fuel is used and the precautions regarding the mixture control are observed.

Detonation

Smith: As long as we're talking about spark plugs, I'd like to say that a spark plug cannot cause detonation. There are a lot of theories about detonation and pre-ignition, but, based on our experience, we can make that statement definitely. Spark plugs can, however, cause pre-ignition. One of the most common causes of pre-ignition by a spark plug is a cracked ceramic. If a spark plug nose ceramic cracks, a loose piece may act as a glow plug and put the engine into pre-ignition. One of the things we work hardest for is a durable ceramic that will stand up in the engine. While a spark plug will not cause detonation, a spark plug can be damaged by detonation. It is a destructive force that can burn holes in pistons, and it can crack spark plugs. Once a spark plug has been cracked, it may go ahead and put the engine into pre-ignition.

Musacchio: Mecca mentioned that our current engines are practically detonation-free I assume he's referring to the so-called light aircraft engine. But, referring to Lew Smith and my own experience with high-powered engines, I know it is not true that the high-powered aircraft engines are detonation-free. In fact, I'd say that's as far from the truth as you can get. I'd also like to mention the fact that Lew said that spark plugs cannot cause

detonation, but can cause pre-ignition. Tying in the petroleum people, isn't it true that if you have a certain performance number of fuel, the fuel is sensitive to different operating conditions and that the detonation band can change quite a bit?

Haxby: This is not quite true because performance number is quite a scientific and precise measurement. It's true you can vary the performance number of the fuel, but you measure this afterwards. If it is not up to the standard, this is not fuel that you will receive. But I would like to concur with Smith that to our knowledge spark plugs will not cause detonation *per se* but they can cause pre-ignition. It is our theory that when you get detonation which leads to pre-ignition, that the eventual failure of a burned piston, which was mentioned specifically, usually results from the pre-ignition area rather than from the detonation area. We've had occasions to look at lots of parts under both conditions. We seldom, if ever, find what we attribute to be detonation as a direct cause of an entire failure.

Musacchio: Going back to this business of performance number on fuels. It's true that if you vary the operating conditions, as in cylinder head temperatures, the sensitivity to detonation changes. You might have two fuels at the same performance numbers, but different chemical contents where, if you ran them at the same temperatures, you might get the same detonation performance. If you vary the cylinder head temperature, you'd get different detonation response.

Haxby: Sensitivity is actually defined as the difference between rich mixture and lean mixture rating. When you have a 115-145 fuel, this sets the sensitivity of the fuel. If you go above max cylinder head temperatures, or if you are operating outside the carburetor air temperature limits, for example, this changes your mixture strength.

Musacchio: I was referring to some tests that Wright made a few years ago in which they found that with two fuels with the same performance number, by varying the temperatures of the cylinders, the detonation response varied considerably. Varying temperatures from 400 to 500 degrees, for instance, they found that the sensitivities of the fuel varied even though they had the same performance number. The detonation response varied considerably to the extent where one fuel might run satisfactorily at higher temperatures and the other one would not.

Foster: Can I take the liberty of defining detonation? Detonation is backfiring or spontaneous backburning in the combustion chamber. You have two spark plugs; you have a mixture in there; you compress it; your spark plugs start two little fires, and they work toward each other. Before they get to each other a spontaneous fire is started in the middle. It's like backburning to stop a forest fire. This gives you loss of power and gives you tremendous increases in pressure and temperatures. Now, to go a little further, a pre-ignition is when these conditions cause enough excess heat in the cylinder and something gets glowing and gives a spark.

Musacchio: I am only trying to bring out that I have seen conditions where with the same performance number fuel, if you varied the cylinder head temperature by X amount, the detonation increase might be measurable.

Foster: You get more knocking on the knock meter.

Musacchio: Les, whereas with the different chemical fuel, with the same performance number, by varying the cylinder temperature to the same amount, detonation might increase to approximately two or three times what it was originally.

Foster: I think this may be because you are effectively changing your fuel-air ratio by changing the temperature of operation.

Haxby: When we speak of a fuel performance number, a group of numbers 100—130, we as suppliers are guaranteeing that you have a minimum of 100 lean and a minimum of 130 under rich mixtures. In certain cases you get more than we guarantee. This has to do with our refinery economics. Sometimes it is to our advantage to give you a few extra lean numbers, or to give you a few extra rich numbers. So, if you were buying 100-130 fuel, it is entirely possible that you would have one that is exactly 100 on the lean side and another that is perhaps as much as 103 or 104. If you put these two fuels in and ran them as fast as you suggest, you would say there is something different between them. There is a difference by four numbers of the sensitivity here. On the lean and . . . but when you get above that to the rich end . . . as long as they are both 130 grade, there should be no difference.

Testing Spark Plugs

Campbell: I know we could go into this one further, but we should get on with the program. Let's go to testing of spark plugs.

Anderson: Our standard recommendation for shop testing after reconditioning is a spark pressure bomb. Through the years this type tester has proved to be quite satisfactory.

Musacchio: Why is it that at certain times when you check these plugs they seem to check satisfactorily, and when you put them in the analyzer, the plug doesn't seem to be doing the job it is supposed to?

Anderson: That could depend a great deal upon the reconditioning job . . . whether all deposits were removed from the spark plug. Keep in mind when you are testing in the engine, it isn't exactly the same as when you test in the shop. Unfortunately, shop methods of testing are not equivalent to actual engine operations. They are compromises. In engine operation you have other variables besides the pressures present in the cylinder. You have operating temperatures. The amount and chemical nature of the deposit greatly influence the insulation value which, in turn, can be

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By BOB MAYS

My job is flying and demonstrating the LEAR L-5/LIFE equipment. This, you will say makes me prejudiced. To this, I agree, because day after day I see many people, including all types of pilots, engineers, etc., who "wring-out" this equipment and come up with nothing but praise.

On my "check-out" flight in a twin aircraft I'd never flown before, using LIFE I'd never seen before, I completed two of the best ILS approaches I've ever made. Next, I made an automatic approach with the L-5 autopilot which was even smoother than the one I had done manually. I especially liked being able to monitor the entire approach on LIFE while the L-5 autopilot did the job.

The L-5/LIFE combination is a great relief to me, especially when I'm flying as a one-man crew. I am free to monitor engine instruments, navigate, communicate, and best of all in this day of heavy traffic density, watch out for other aircraft—greatly decreasing the chance of collision.

The NAFLI ATTITUDE/COMMAND INDICATOR gives me a clear and *natural* presentation of my aircraft's attitude at all times. And in ILS approaches I simply follow its *command* signals for smooth, precise interception of the localizer and glide slope.

The SITUATION DISPLAY INDICATOR pictures my position in relation to the localizer beam, VOR radial or selected track—in the meantime, the L-5 holds my assigned altitude and flies the heading or track I have chosen.

To fly an airway, I merely push two buttons, and I automatically maintain my desired altitude and track. Even my *wind correction* is figured automatically and compensated for me. And the SITUATION INDICATOR shows me my exact crab angle due to cross-wind.

I often fly long hours, and the L-5/LIFE combination allows me to arrive at my destination far less fatigued and therefore mentally alert to approach and land, which is vitally important.

Because of L-5/LIFE's simplicity and reliability, I have lowered my personal minimums considerably—it has taken all the sweat out of low visibility ILS approaches.

Holding patterns, weather and clearances are no longer a three-man job. I receive and transmit clearances while flying a holding pattern by merely turning a knob or pushing a button.

All kinds of people have flown "LIFE"—a 15,000 hour airline captain—private pilots, both IFR and VFR—and their praise was unanimous.

In conclusion, this L-5/LIFE combination is not only wonderful to fly, but a real thrill to demonstrate. As the French say, "C'est la vie"... THIS IS "LIFE"!*

Bob Mays

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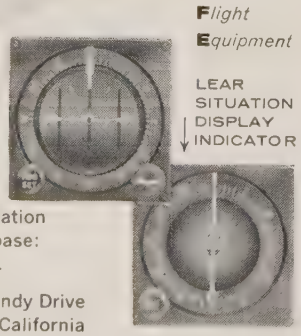

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varied by these temperatures. Furthermore, you may have moisture in the connector well, or perhaps the connector wells were not properly cleaned. Plugs that have silica in the deposits will test perfectly on the shop test and be completely inadequate within the engine because temperature affects the insulation value.

Musacchio: Then bench checks are not 100% proof of satisfactory operation?

Anderson: It is if the spark plug is completely cleaned.

Campbell: The combustion pressure of the engine alters the analyzer pattern from that of the normal check on the bench.

Gossett: We might answer this by saying no laboratory test will ever answer the question completely as far as actual use goes.

Kovac: It's my opinion that whenever a spark plug fouls out in service, it should be thrown away rather than overhauled. There is a good possibility that the spark plugs may have been manufactured out of its heat range, and, therefore, had two strikes against it before it started. I believe spark plug manufacturers will admit that although they like to get a specific IMEP rating on a spark plug, they have to work on a limit of perhaps plus or minus 5-10%, and very often they fall out of these limits unintentionally. Unfortunately, this fact is unknown until the spark plug is put into an engine and starts to get into trouble. It is a mistake to try to overhaul it and put it back into the engine. It is better to throw it away.

Combustion

Campbell: Next is an engine item . . . combustion, idle, cruise and techniques used to achieve best combustion.

Smith: Actually it's in the idle range that the operator has most control over combustion. The manufacturer puts on the carburetor an idle mixture control so that after the engine is installed in the aircraft, with the air scoop and the exhaust system that go with it, the operator can set his idle mixtures for best combustion under his particular conditions. Once he gets the setting made he is going to have to change it from time to time as the weather changes, but that adjustment is under his control. Except in the idle range your combustion characteristics are pretty much built into the engine by the manufacturer.

Mecca: I think the same holds true for the light plane engine. The majority today are equipped with the carburetor that has the manual mixture control which allows the pilot to adjust his mixture. It's been a long standing procedure to, first of all, never use it under 5,000 feet; above 5,000 feet, with fixed pitch propellers, lean until an increase in rpm was noted, then enrich until that increase was lost. This was done to insure that we were back on the curve beyond lean-best power. The helicopter provided a more difficult problem as far as mixture control was concerned. We recommend the carburetor that incorporates automatic an altitude control. A small bellows in the bowl is pressure sensitive and automatically regulates the mixture. This has proved far more satisfactory than the manual mixture control.

Ignition Harnesses and Leads

Campbell: High tension systems, low tension systems, moisture problems is the next group item. Any questions to be asked of us in the manufacturing business?

J. R. Ingram *(American Airmotive)*: Regarding a cast filled harness on 2800C engines . . . what can be done to do away with condensation in the distributor bowl? The pump were taken out according to the Scintilla bulletin, No. 201A, the vent lines were taken out and breathers put in. After 300-400 hours of operation, the distributor bowls are saturated with condensation. We have not been able to come up with a fix.

Campbell: You have the small ventilator plugs known as 10-37700 Ventilator Plug? That's about all we have to recommend. We've noticed in some instances that the location of those elaborate types of plugs has been directly under the slipstream instead of at right angles where you get the greatest effect of ventilation from it.

Kovac: In the R-2000 days when the same problem was being experienced with the engine ignition system, the "antler" type vent system was developed whereby a couple of long tubes were wrapped around the nose of the engine and a drain line was rooted to the accessory section which was, you might say, the low pressure area. By having the ram air going through your antler tubes, circulation was provided through the distributors then into the accessory section. This system proved itself to be very effective. However, there's added maintenance and tubes also added some weight.

Ingram: We had these vent lines on the engine to begin with. We removed them to install the breathers to do away with the condensation.

Campbell: Your facility is in Miami?

Ingram: Yes, but I'm talking specifically about Delta. They fly C-46's which operate with -57 engines. They fly from the warm into the cold climate.

Campbell: Do you use this wax coating, Scintilla 72 Compound, to paint those terminal posts?

Ingram: Yes. We've discussed this with your representative. He recommended to go ahead and saturate the distributor bowls with the Bendix Wax Compound No. 72. If that doesn't fix it, then go back to the pumps.

McClintock: I'd definitely go back to the pumps. Instead of pressurizing the magnetos, just pressurize the distributor bowls. I don't think putting on this type of ventilation would do any good. Best to go back to the pump and pressurize it. Get a little air flow in there, and don't connect the hoses to the magneto. I think that will eliminate your problem. We have today several R2000 engines that we still have a problem on . . . hard starts after shut-down. Al-

though they do put the wax on, you can't get it started. They go ahead and introduce nitrogen into the high tension part of the magneto. So, I'd go back to the pump.

Campbell: In pressurizing that R-2800 system, you must pay very particular attention to the clearances, particularly at the terminal block, also the terminal electrode.

Ingram: Best of my recollection, we have the late type electrode.

McClintock: Where you have those long terminals and you have the little electrodes screwed on top, you could decrease your electrode clearances, what are you running into, engine roughness or hard starts?

Ingram: Only complaint we've had is condensation, so, I presume roughness.

McClintock: You could try decreasing gap clearance.

Campbell: One point here, if you start easy, it isn't condensation.

Ingram: On your DF18LN mags with the secondary condenser, or with the terminal block, is there any reason why the point opening could not remain the same at 27 degrees?

Campbell: Recommendation we have is 24 degrees, the best overall range for that magneto.

Ingram: The service bulletin 174D recommends 27 degrees, plus or minus one, with the terminal block. However, with the secondary condenser, I believe it's 23 degrees, plus or minus one. In supplying magnetos to the operator . . . they test the mags before installing them . . . they were unaware that condensers were either secondary or terminal blocks. When they found that the gaps were different, they reset them to 27 and were using them satisfactorily. However, we do not recommend this.

Campbell: Neither do we. We recommend going by the service bulletin.

Kovac: Actually what happens is that if you operate the ignition system without the secondary condenser with a 23 degree dwell, you will have satisfactory operation for a few hours. However, every other spark plug will be affected after some 20-30 hours of operation because you affect the energy available to that spark plug. It is very strongly recommended to use 27 degree dwell.

Ingram: Then we should use the terminal block rather than a secondary condenser?

Campbell: That's right. No more secondary condensers.

Ingram: Regarding high tension ignition as on your 2800-51 engine, the high tension ignition cable, 7mm, we received little pieces of wire from one operator without any comment. We'd like to know what the cause is . . . cylinder head temperatures or the cable itself breaking down? We've sent samples to the cable manufacturer. They requested we send new cable samples. We did so, and they gave us a report that the cable passed all inspections to their specifications.

Campbell: What's the general condition of the cable?

Ingram: The cable is cooked and disformed, particularly where it goes through the spark plug elbow.

Campbell: What type aircraft is it used on?

Ingram: C-46 aircraft with R-2800-51MI engines.

Campbell: We've had problems of cooking insulations, particularly in South American operations.

Kovac: Even at best, neoprene cable, after being in service 1,000 or 1,500 hours, will get hard and quite brittle at the ends. Most manufacturers of ignition systems recommend the use of silicone wire. Initially, it costs more, but it can be left in service for more than one engine run, whereas neoprene has to be replaced after each engine run.

Campbell: Most of the lead suppliers today supply leads which incorporate the silastic insulation. It does a very nice job, and we've had no trouble from that source.

Wild: What are you people doing with these -25 and -26 mags with the point troubles they've been having on the Lycoming engines? They turn up so fast that they pound the points right out of them.

Campbell: We've tried to solve that situation by better balancing the circuit. We have a different type of rotating magnet, the "fat" magnet. We feel this will give much better performance life than the present magneto is giving. It is interchangeable, and that, with other changes, should help the light aircraft engine ignition performance. The magneto we call the -60 is designed to take the 30- to 35,000-foot operation and is really designed for accessibility and maintenance.

Landi: What are you doing to eliminate the high speed bounce in the Franklin 200 and 210 hp engines' magneto breaker points and breakage of cam followers?

Campbell: We've been doing a lot of experimenting with different types of cam follower materials and the cam. Our new follower seems to be doing a nice job. We are going to use a sintered cam which seems to be more compatible at the speeds at which they are run. Before, when an aircraft engine ran at 1900 rpm, it was a comparatively easy job. Right now on takeoff, the small magneto is running at 5126 rpm.

Any questions on the low tension system, our next topic? Our biggest problem on the R-3350 centers around the distributor finger. (We've changed the terminology and now call it the distributor rotor; it's the carbon brush and collector plate.) We still have some collector plate burnings, but we are gaining on that. Another peculiar problem on the R-3350 on the EA and DA series of engines, is the migration of the oil from one breaker assembly to the other. One will become dry while the other picks up all the oil. We've been unable to determine the cause. The magneto on the R-3350 is doing a job.

Rhodes: You mentioned that you are designing a low tension ignition system for the smaller engines. What is the status of that?

Campbell: That's in the research de-

(Continued on page 48)

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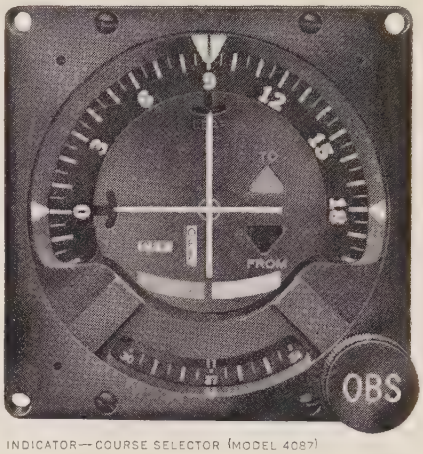

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THE GOOSE GETS FOUR ENGINES

In Sandy, Oregon, something unusual is happening to the Grumman Goose. The twin-engine amphibion has had something new added . . . two additional engines.

A. G. McKinnon, of McKinnon Enterprises, started a year ago to develop a 4-engine, versatile executive transport. The airplane is now undergoing CAA flight tests.

Not a routine modification or conversion, the addition of two engines necessitated nearly a 60% rebuild of the entire airplane. The McKinnon Goose will come out under an entirely new certificate and will not be covered under a supplementary type certificate on the old Grumman Goose.

Using Lycoming 270 hp engines with 3-bladed Hartzell propellers, the Goose has a rate of climb of 2500 fpm. At 10,000 feet pulling 65% power the plane will cruise at 225 mph true air speed. With the same gross weight on water, the McKinnon Goose will take off in 10 seconds when adhering to the manufacturer's recommended power settings at sea level.

The propellers are full-feathering and reversible. This feature is mainly for water handling and maneuvering to docking facilities. Although the reversible feature is an added safeguard for short field landings, the plane has a 60 mph landing speed even at 12,000 gross, states McKinnon.

Wing-tips are extended 18 inches and retractable floats were designed to clean up the plane as well as to provide wing-tip boards.

A 15-inch extension of the nose serves as a radar dome as well as giving a more streamlined appearance.

Picture windows, 18 by 57 inches, are installed on both sides, plus an extra window in the escape hatch, in the entrance door and in the lavatory section. A one-piece curved windshield with overhead windows is another innovation.

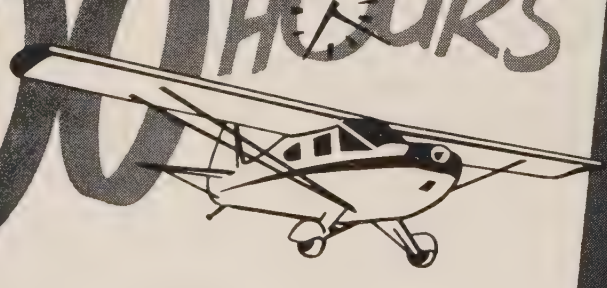
Fuel capacity is increased to 450 gallons from the original 220 by installing auxiliary tanks in the wings. Range is 1500 miles.

A special instrument panel has been designed to include dual flight instruments. All radio control heads are mounted in the center of the panel.

Following completion of certification by the CAA, the airplane will go to Horton & Horton, Fort Worth, Tex., for a custom executive interior.

Prices are quoted tentatively by McKinnon. The conversion kit will be around $125,000. Where McKinnon furnishes the airplane and complete package built to the customer's specifications, the prices will range from $225,000 to $300,000 per plane.

600 HOURS



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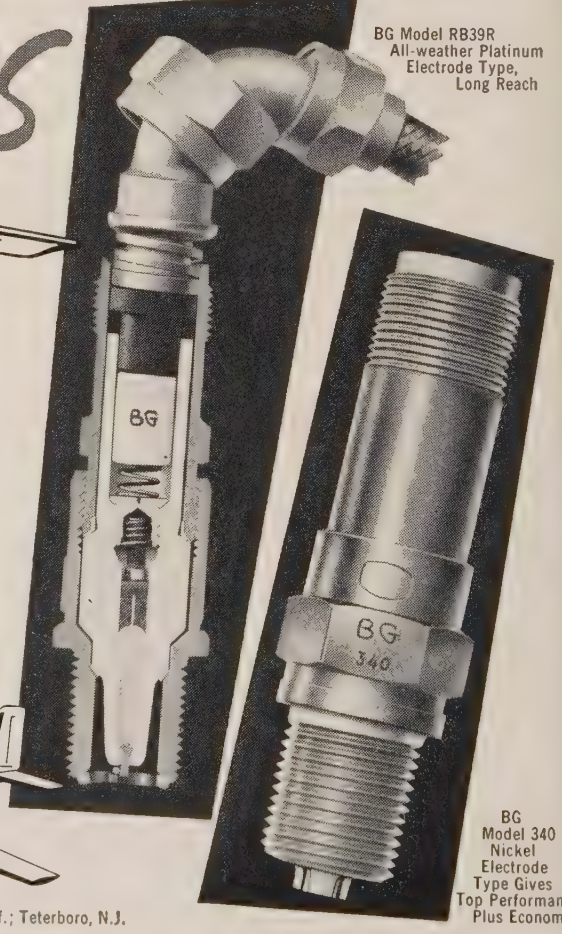
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Greenhouse Patter

By "Torch" Lewis

N GARDE DEPT: Here it is—an vercast, somber, dripping wet, depress-ig Monday morning. A dreary looking essenger has just deposited the morn-ig mail on my desk, the usual garbage -glassine envelopes, handbills, foot-ills, advertisments, ad infinitum, ad auseam. No checks, no jazz, but what an one expect from a day like this? ere's a bill from Atlantic Aviation. et's open it and write a nasty note to l Basso. What the heck is a IEAM 25-J Blower?—anyway it's worth 33.80 in case you need one. I often onder about the jargon of the aviation arts men. Of course, everyone in ccounts Payable is sure that I know hat all these funny sounding, horribly xpensive parts are—here is a 5058 elay which is a trifling $18.00 about hich I haven't the remotest. That asso is a stout fellow tho, entirely onest, albeit a true Company Man. /e will pay this bill—no squawks.

Well, here is the Monday morning ntelligence from NBAA—I'll open the kinny one first. Tum te tah, WHAT HIS—GADZOOKS! EGAD! CAB raft release number 58-10 from Fed-ral Register May 13, 1958, ETIO-OGIC AGENTS, TRANSPORTA-ION OF, and PROCEDURES TO BE OLLOWED IN CASE OF LEAKAGE F and PACKAGING SAME. "Etio-gic Agents," the release intones, are the causative agents of the follow-ig diseases: Anthrax, Botulism, Brucel-sis, Cholera, Colorado Tick Fever, tc. Etc."

I have always been suspect of some f the odd looking AGENTS who get board aircraft at large airports. At enver once, for instance, I saw a lot of ed-eyed AGENTS get aboard our New ork bound, UAL DC-7, who were bviously suffering from the vile effects f the infamous Colorado Tick Fever, s they all wuz busy taking last minute ostrums and potions in the room to the ft of the terminal lobby and they all ad a nice PACKAGE on. They must ave spread this stuff around New York eal good, because every time I spend a ight in New York, I see sumbuddy with ne same symptoms.

Miami and Las Vegas are good places look for somma this other stuff.

In Philadelphia come September, I ill certainly be disappointed not to un across some fresh ground Brotherly rucellosis. WALTER PAGUE run on somma this at the Detroit Meeting—at's the same week he invented the ew drink called the Penicillini— 4 oz. in, 1 oz. imported Italian Penicillin.

The NBAA release closes archly with is reverberating warning. "June 16th deadline for comment to CAB. June 5th is proposed effective date of the evision." I certainly hope that you all ot in on this thing.

Did y'all see the picture of the new 27 at Fairchild. It really DOES have hite sidewalls.

See you in Philly.

WAA Business Flight Safety Award To Be Administered At NBAA Annual Meeting At Philadelphia

"Sometimes safety is just a better way of doing a thing," states the Women's Aeronautical Association of Kansas. The WAA will be making its fourth annual award to an individual outstanding for his contribution to the furthering of business flight safety.

The presentation will be made at the National Business Aircraft Assn. meeting Sept. 22, 23 and 24, at Philadelphia, Pa.

WAA trophies previously have been awarded to C. E. A. Brown, 1957, for his efforts in sponsoring the Flying Green Cross safety program in the State of Ohio; to Jesse W. Stonecipher, 1956, for his perfecting the "180-Degree Turn;" and to John Gaty, 1955, for his series of safety pamphlets.

The award, established in 1955, was the result of a WAA member's survey of national business-flight safety activities. Finding none, WAA set its own.

President of the WAA of Kansas is Billie Wallace. The Business Flight Safety Committee is headed by Irene Harmon, Chairman; Marion Higdon, co-chairman; Ruth Houser, Marguerite Lee, Bea Patterson, Monique Bobb and Ruth Elliott.

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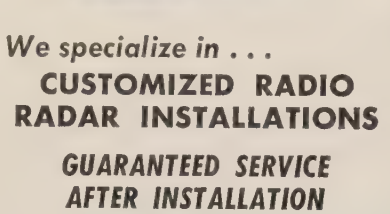

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Circle No. 22 on Reader Service Card

Airport and Business Aviation

(Continued from page 14)

*In addition, there were 711 multiengine (Class I & II) aircraft used for the primary purpose of passenger and cargo, for hire.

Thus, we had 63,853 total General Aviation Aircraft as of Jan. 1, 1957, of which 25,350 were engaged in business transportation. When we figure from our earlier statistics that *only* 1 or 2% of American businesses today operate aircraft in business, and yet that total is almost 40% of *all* of the airplanes flown in general aviation, you can see the terrific expansion that is potentially there. And that means headaches, gentlemen for you, because these aircraft, if they are to be properly utilized must have adequate ground facilities.

Your airport is a vital part of the growth of the communities in your area. You have got to be selling *that* every day. You have got to sell *the businesses* in your area, that their future in this narrowing world of today is going to be *in the air.*

We must have proper allocation of air space. Most certainly business flying, which furnishes the greatest potential user of airspace, must have its adequate share of air space. The voice of business must be raised again and again to stress that basic need. This is necessary to the well being of American business and of your communities. We all have to plan for a brighter future.

Certainly your Chamber of Commerce is going to promote your airport facilities in their brochures when they are seeking to attract new business.

In a way you are the ambassadors of that type of growth. If Corporation X located in New London, Connecticut, wants to relocate in the West or South or any place else, they may fly into your airport to look over the area. If you know they are coming you give them the red carpet treatment, but if you don't know they are coming, they might get shrugged aside. This isn't good politics for your communities.

I know you are saying to yourself—that is fine, but it costs money! If you analyze some of these statistics and where the money comes from that the aircraft industry receives, you will find that a great bulk of it is from the businesses of this country. So don't sell these customers short.

Now I would like to talk to you of the problems that airport executives and business aircraft operators have in common.

Essentially, business aircraft represent a time-saving convenience to the user. The best way to insure the continued growth of this, the largest segment of aviation, is to provide efficient service so that the aircraft can be used in the most efficient and economical manner possible.

The flying business man is paying for premium transportation and expects the airport ground handling environment to recognize his needs. He is a customer—and from all indications will be your *biggest and best* customer in the future. Last year business aircraft used an estimated 115,000,000 gallons of fuel alone, almost half of the total amount consumed by the scheduled domestic airline fleet, which is tremendous.

Present planning by many airport officials and governmental agencies has failed to properly consider our needs. While frantic attention has been focused on airline airport requirements to support jet service, few have noticed that the business operators have over 100 turbine powered aircraft (pure jet and turbo-prop) presently on order.

In other words the best, the most modern equipment that is developed will be flown *by the business aircraft users*, just as certainly as it will be flown by airlines or military.

Gate space for business aircraft users near the main terminal has been—and continues to be—a vexing problem at many airport locations. Overall, however, service has improved at most airports over the past few years. Since our operators, unlike the airlines, do not have a ground service organization, business aircraft operators *are dependent on* the facilities made available by either the airport or fixed base operators.

I am sure the airline industry will readily agree that their best users are corporations and those men who bring in business. The air transportation industry will grow as a result of that support. In fact, the utilization of aircraft in business has *encouraged* the use of air transport facilities, has aided thei development, the representatives of ai lines agree.

There is a need for more promp connections between the airlines an the feeder business aircraft are ofte utilized for that purpose. Gate spac accessible, the opportunity should b made to stop and discharge, where there *is a space* and there is *a connection being made* for an airline flight. There ought to be an opportunity for the air craft to pull close to the loading point discharge its passengers and get out o the way without creating a safety o troublesome hazard.

That problem is going to become more acute as we begin to use the heli copter to a great degree.

We hope we can foster the growth and development of fixed base operators by greater use of their services They are a necessary adjunct to our business.

We need their facilities. At the present time SKYWAYS magazine, which is our official publication, is reproducing their Airport Service Guide for business pilots.

It is important to have aircraft users know the facilities that are available It is important for you men to encourage, develop and plan for the promotional expansion of your facilities and along that line I want to make this comment clear.

The financial responsibility, the dollars and cents determination, of business aircraft is made by the people *who operate and run the business!* Many of our larger companies have executives definitely in charge of that operation and it has become a miniature airline to be used for company purposes.

What I want to suggest is that you become familiar with the men behind the scenes. The men who hold the purse strings, who plan for tomorrow, who are willing to invest a million dollars in a new Fairchild, or whatever we have, who are planning some of these things. Those are the men you should go to with some of your airport problems. They will help you locally in the development of your facilities, explaining the need for this planning.

If you have only a speaking acquaintance with the vice-president or president who uses a business aircraft; if say "Good Morning, Mr. Jones," as he comes or leaves, you are not doing your job. Mr. Jones ought to be interested in your airport, your facilities, and your planning. All the money he has in that aircraft won't be worth a dime if he doesn't have a place to use it and fly it. If he is not interested, he should be interested, and believe me, gentlemen, that is our job—to acquaint these people who are spending these millions of dollars—in the ways in which to spend them wisely and well and to plan for tomorrow.

In conclusion, a closer working liaison is needed between men locally prominent in aviation and the representatives of business in a cooperative effort to further better aviation facilities.

Satellite

(Continued from page 32)

lick is released. The washout of the ing tips coupled with the airfoil sec- on used and the proportions of tail ea and deflections make the ship as ear stall "proof" as anything I've own.

At Torrance, Bob talked business hile I shot a few takeoffs and land- gs. The approach is steep, ideal for any small fields which business pilots ight favor in lieu of remote, crowded rminal airports. The combination of aps, low wing and good brakes slow e ship rapidly after touch down. The mbined trim and flap control simpli- es approach handling.

The Satellite carries its fuel in two ading edge tanks with individual filler ecks in the wing root fairings. Each nk holds 16 gallons, giving the ship a nge of more than 650 miles with re- rve.

We flew out to the Desert Air Hotel ear Palm Springs. The trip was un- entful although the air was getting uite rough, but the Satellite rode it icely, the short fuselage notwithstand- g. We trimmed the ship out at 10,000 et at 25 degrees Fahrenheit outside r temperature, pulling 19 inches anifold pressure at 2475 rpm, indi- ating 110 mph. This was a true air- peed of 128 mph using 58 hp and urning five gallons an hour. Twenty- ve miles per gallon at 128 mph is effi- ent cross-country for my money!

Letting down, the plane's airspeed uilt to 155 mph to demonstrate how nooth the ship is at it's placard Never xceed speed.

Back in the air, after lunch. for the eturn trip, a time check showed our roundspeed cut to 124 mph. When Bob t me out at Hawthorne we were just 5 minutes from takeoff for the 115 iles, a groundspeed of 125 mph.

The only complaint I could find with ne ship is the lack of cabin ventilation n the first production model. This will e remedied, I'm told.

The Satellite is an ideal two-place lane for the business man who needs erformance and can get along without our seats. It is economical, its fuel con- umption and engine maintenance run- ing about 65% of similar costs for our-place light aircraft. It will also be deal for fixed base operator training se where low wing, retractable tricycle ear with controllable prop and flaps re desired. Since most modern busi- ess aircraft are using these features it s important that operators keep pace vith training equipment.

tandard Features include:

Continental C90 engine with 95 hp takeoff rating
Controllable prop
Electric system
Retractable, tricycle gear
Starter and generator
Adjustable seats
Hydraulic brakes

Price is given as $6,720 FAF.

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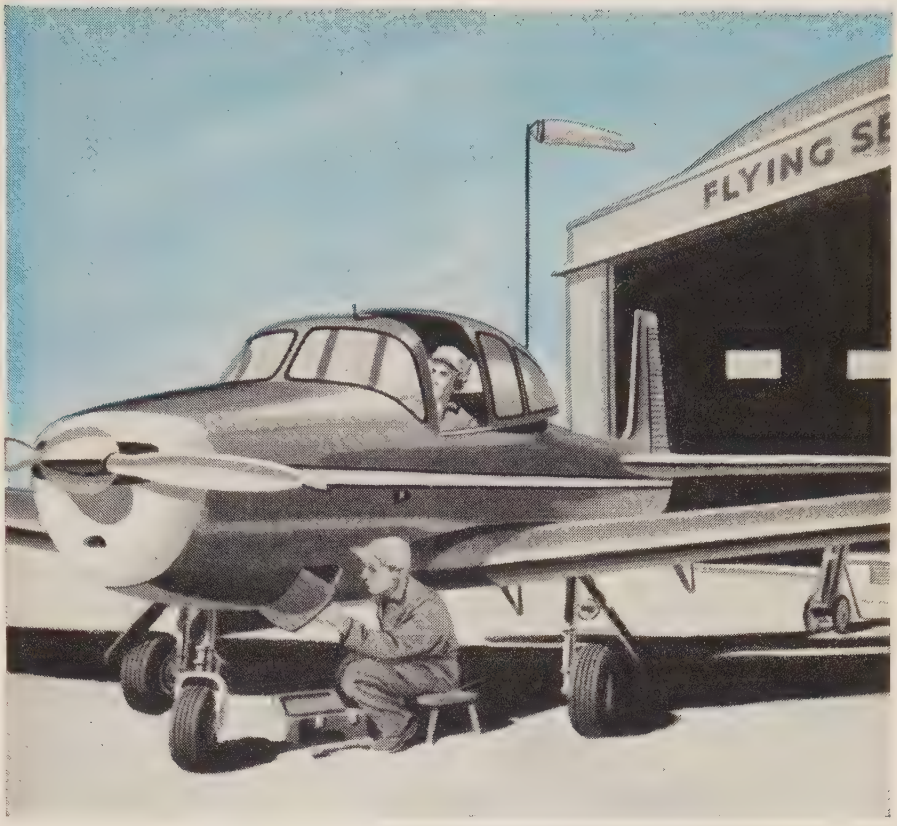

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Pacific Airmotive Corporation
Kansas City, Kansas

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Standard Aircraft Equipment Co.
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Circle No. 23 on Reader Service Card

Who Has Priority

(Continued from page 17)

ture into brackets and plotting the available passenger-miles in each bracket, you can produce Figure 1. This curve may of course look like most anything depending on who is doing the most traveling. Multiplying this curve by the average wage in each bracket produces Figure 2. This is our desired *curve of Passenger-Mile-Dollars.*

Returning to our original argument for a moment, this curve is also *Passenger load in dollars* times *Aircraft-Miles.* Thus (for any given load of "Passenger Dollars") the curve shows *the relative* amount of utilization in each wage bracket. Maximum potential occurs at point A . . . company policy on who gets the aircraft ought to go down at least this far. Judgment must now enter the picture if you are to assess the curve further.

This whole case boils down to the argument that priority rights (for routine transportation) ought to be proportional to the individual's salary. The ideal way to get the maximum number of "Passenger-Dollars" aboard each flight would be to hand out coded priority cards . . . put it on a dollar bidding basis. Since they'd probably hand the cards right back, you might as well try something else. No one really knows the answer to this question, but certain decisions are easier than others. For example, there is undoubtedly a group of men at the top of your company who have the "unquestionable right" to the company plane. Below this group, opinions on priority rights become shaded . . . changing from certain to fairly certain to don't know to probably not. This is where the trouble is . . . "How far down should we go?" Your present policy may well be down around the "fairly certain" area. Can this policy be improved?

Suppose you ignore everything but that small select group of men about which everyone is certain. If you averaged these men's wages and erected a perpendicular through that wage bracket, you would intersect the curve at Point B. This point is necessarily limited by judgment. If you proceeded from there horizontally to the left, you would intersect the curve again at C. This is the *Opportunity Limit.* Statistically, you have the same utilization potential (with the same number of "Passenger-Dollars" aboard the aircraft) in this wage bracket as you do at point B. If everyone agrees on the decision at B, why not turn the operation loose down to the wage bracket at C? You should *average* the same benefit (without any priority system at all) by going down this far, as you would by restricting the operation to the wage bracket at B. (Put the operation on an impersonal bidding basis . . . the largest group gets the airplane.)

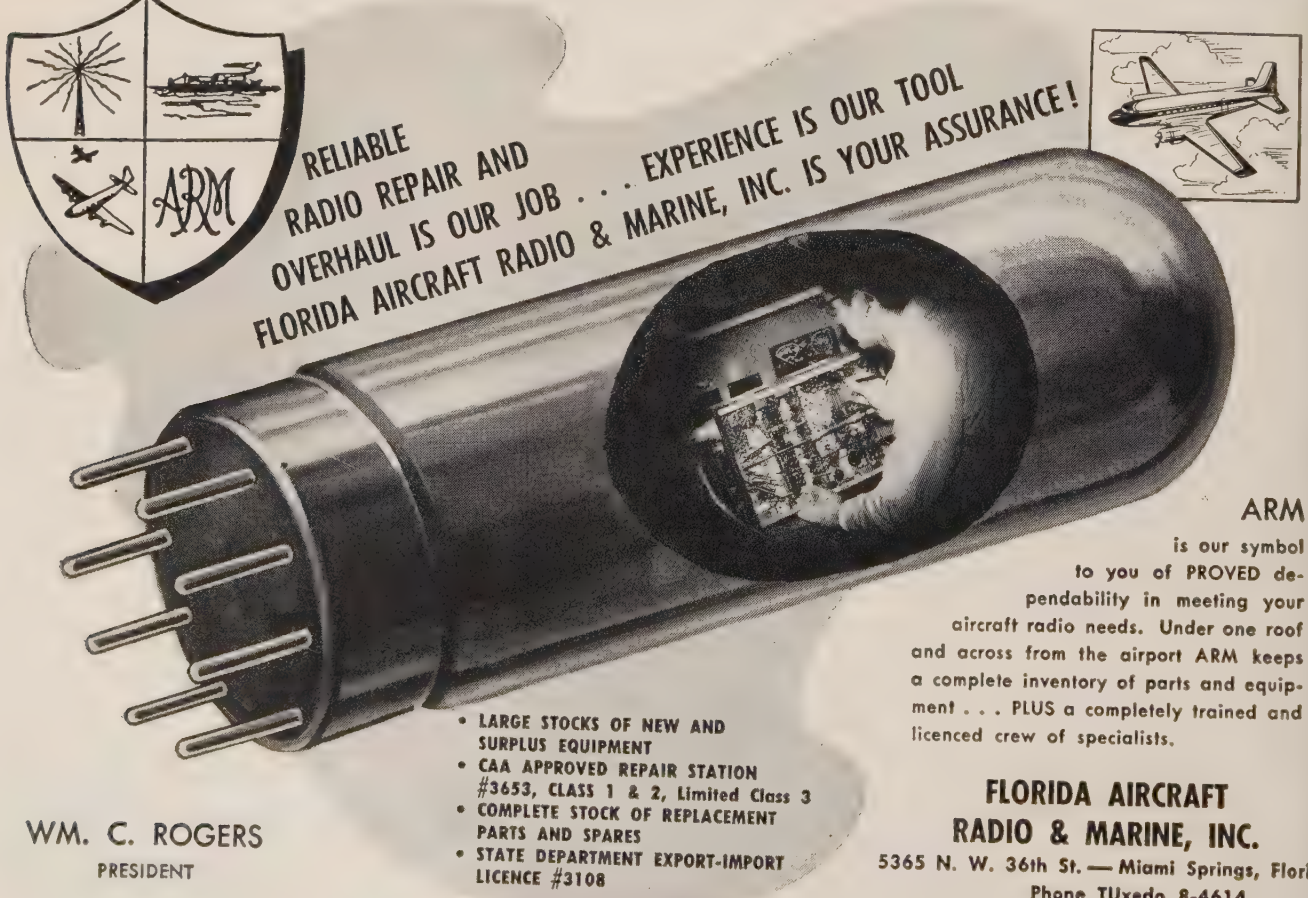
When the Executives decided on the small select group of men, they specified (indirectly) the number of "Passenger-Dollars" which they thought should be aboard the aircraft. This is the wage bracket at B. Or if they specified mo than one man, then the load would *number of men* times *wages at B.* T wage bracket for the Capacity-Lim at D is then found by . . .

$$\text{Capacity Limit} = \frac{\text{Specified Passenger-Dolla}}{\text{Aircraft Capacity}}$$

This is a limit only in the sense that th specified number of "Passenger-Dollars is also a limit. Below this wage bracke you don't have enough seats to sustai that passenger load value. The nece sary load factor will fall off betwee C & D.

There are other methods for a proaching this problem. Some wit greater objectivity and accuracy. Som designed for a special need. You ca afford to go deeper into the wage stru ture than these answers indicate becaus proportional priority does not accou for the money the passengers woul have paid to travel by public transpo tation. Are you down this far?

In any event, you have something t think about . . . and perhaps a weapo for increasing utilization. (Stuff you pockets with these "Passenger-Mil Dollars" and go on the offensive.) Asid from this, and barring special case we need an efficient system for using th aircraft to the company's best financia advantage. We have only to look at th airlines' complex system for analyzin costs, revenues, and passenger pote tials, to remind us of the lack of a organized approach to the questio peculiar to our business.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Aviation Writers

(Continued from page 23)

The Officers' Club lunch sponsored by Convair (NBAA member) Div., General Dynamics, and Hughes Aircraft.

Beautiful weather enhanced the day which featured a "Man in Space" symposium in the morning and an aircraft exhibit with fly-overs in the afternoon. Engineering test pilots Scott Crossfield, North American Aviation (NBAA member), and Maj. Ivan Kincheloe, USAF, participated in the symposium.

A poolside buffet, Hawaiian style, at the AWA headquarters hotel, the Shamrock Hilton, was a delightful finish to the day . . . hosted by North American Aviation . . . especially for some AWA'ers who swam through the entire evening, coming up periodically for food and drink. Understand there were some minor complaints about some AWA'ers singing barber shop quartet style in competition with the exotic Hawaiian music. However, it seems that one of the NAA hosts was the lead baritone. He was supported, vocally, by Beech Aircraft reps and a couple of other "unidentified" types. That Hawaiian rum punch was the greatest!

To start the final morning of the week, Southwest Airmotive (SAC) provided pre-breakfast coffee and a first aid bar. Typically SAC, the waitresses served Bloody Mary's and the silk in those short, short skirts kept the bleariest characters eyeballing.

At breakfast later the survivors were treated at Houston International Airport by Allied Instrument, Tusco Corporation and Aero Commander.

The rest of the morning was devoted to business aircraft demonstration flights and an aircraft exhibition. Understand the Cessna 310 was sold there at the Convention.

Leading the array of planes was the Lockheed JetStar which had arrived at Houston after establishing a new coast-to-coast speed record for itself. It averaged 562 miles per hour, cutting six minutes off its previous record. Leo Sullivan, chief engineering test pilot of the Lockheed Aircraft Georgia Division, piloted the No. 2 JetStar prototype on the record flight with Robert Schumacker of Burbank, Calif., as co-pilot. (A pilot's report by Herb Fisher will be in a coming issue.)

Other participants were Aero Design & Engineering Corp. (NBAA member), Beech Aircraft Corp. (NBAA member), Cessna Airplane Co. (NBAA member), Gleason Romans Pipeline Patrol Co., Mooney Aircraft Inc., Navion Division of Tusco, Piper Aircraft Co. (NBAA member), and Trans-Texas Airways. Some of these included conversions.

The morning program concluded with lunch sponsored by Eastern Air Lines.

Ed Pipp, aviation writer for the Detroit News, was elected President of the Aviation Writers Association succeeding George Rhodes of the San Francisco Call-Bulletin.

The Annual AWA banquet officially concluded the week-long meeting. The Foreign Flag Carriers hosted the reception before the banquet. Morton Downey, for the Coca-Cola Co. (NBAA member), entertained the group with his particular style of singing.

Lt. Gen. Donald L. Putt, Deputy Chief of Staff, War Weapons Development, was the speaker.

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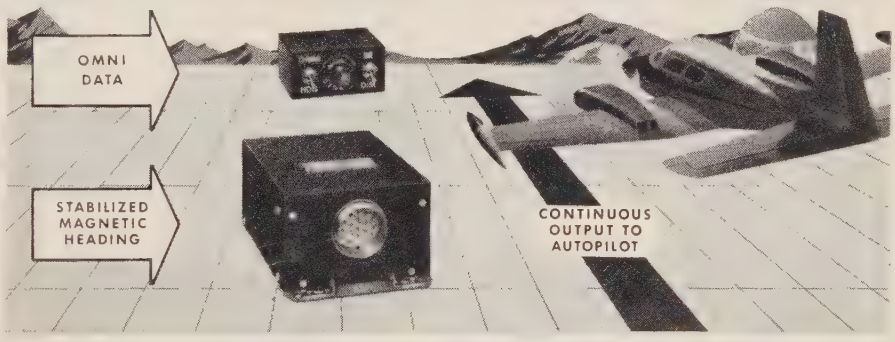

The DYNAVIA AUTOPILOT NAVIGATION COMPUTER

NOW makes automatic enroute navigation a *practical reality.* It uses inputs as shown to furnish electronically computed steering data to an autopilot to lock to inbound or outbound omni radials or to a selected magnetic heading.

Type ANC-2 is specifically designed to use heading data from the Course Director for operation with the L-2 Autopilot. The system operates with or without installation of the L-2 DG thereby conserving critical panel space.

Overall Weight . 4 lbs.
14 or 28 V, ½ amp.
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INDIANA TECHNICAL COLLEGE

Navicom

(Continued from page 27)

ply measuring 5¼ x 5¼ x 3½, capable of being mounted in any position without shock mounts; an indicator with an easy to read right-left needle, and which fits a standard 2¼ inch instrument hole, plus a ferrite loop that has negligible drag.

Frequency range is 200 to 450 KC and standard broadcast bands from 550 to 1600 KC. An extra feature is a one-second time constant on the indicator needle which eliminates influence caused by static disturbances and heavy weather conditions.

Available in a variety of colors the Bird Dog will market at $495 for the entire unit, including ferrite loop.

Circle No. 53 on Reader Service Card

Effect of Proposed New VFR Minimum Evaluated

A good deal of the discussion pro and con any increase of VFR minimums usually results in exaggerated claims and counter-claims unsupported by any real substantiation. Proponents of the change draw their greatest adherence from such professional groups as the ALPA, etc. They visualize gains in anti-collision safety while apparently disregarding the fact easily observed at any busy control airport that their own membership often resort to VFR to avoid delays inherent in ATC handling.

Antagonists of the proposed changes charge with equal disregard of fact that increase in the minimums will virtually ground all non-aircarrier air traffic. What are the facts?

The New York State Department of Commerce, Aviation Bureau made some studies at the larger airports in that state. Looked at one way, the figures show that a 50% increase in VFR minimums (to 1500 feet and 5 miles) would produce a 250% increase in restrictions to uncontrolled VFR operations!

Approached from the other angle the statistics could be used to prove the actual average increase in such restriction would be less than 15%—or almost insignificant!

Results for the airports studied show:

Albany Airport: three-year period 1955-1957, minimums are below 1000 and three about 9 percent of the time. They are below 1500 and five 19 percent of the time, about twice as often.

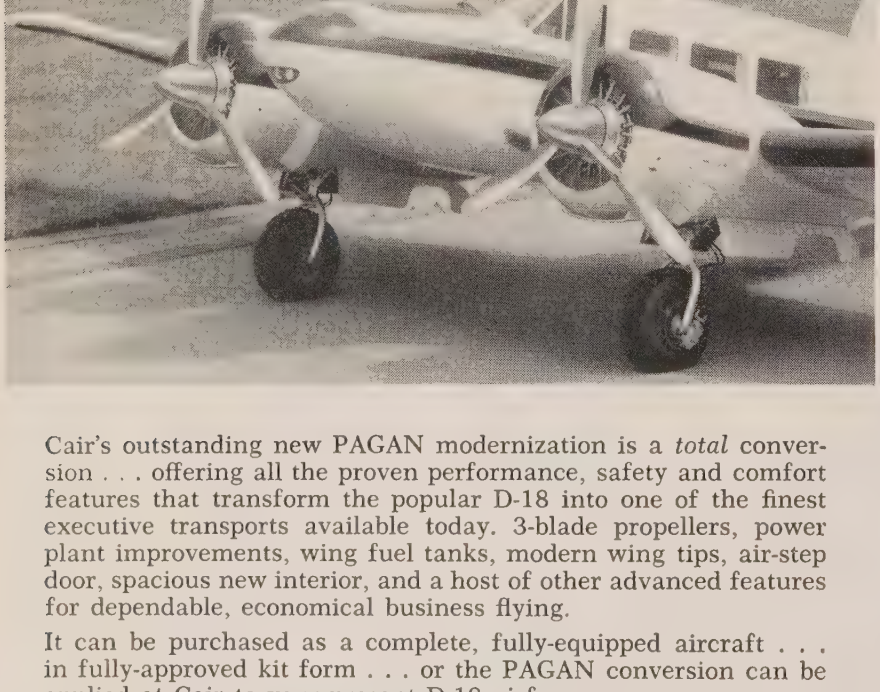
Buffalo Airport: two-year period 1956-1957, minimums are below 1000 and three 9.6 percent of the time, and below 1500 and five 25.5 percent of the time, over two and a half times as often.

Syracuse Airport: two-year period 1956-1957, minimums are below 1000 and three 6.9 percent of the time, and below 1500 and five 18.2 percent of the time, over two and a half times as often.

Rochester Airport: two-year period 1956-1957, minimums are below 1000 and three about 9 percent of the time and below 1500 and five 16.5 percent of the time, nearly twice as often.

New York City (LaGuardia): two year period 1956-1957, minimums are below 1000 and three 13 percent of the time, and below 1500 and five 35 percent of the time, over two and a half times as often.

The Empire State being noted for its bad weather it would appear that other parts of the country would reflect happier figures. Meanwhile the collisions continue to occur *almost exclusively* in CAVU!



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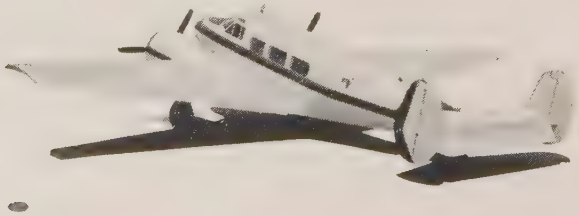
It can be purchased as a complete, fully-equipped aircraft . . . in fully-approved kit form . . . or the PAGAN conversion can be applied at Cair to your present D-18 airframe.

GET THE COMPLETE PAGAN STORY—Write for free copy of 8-page illustrated PAGAN brochure.



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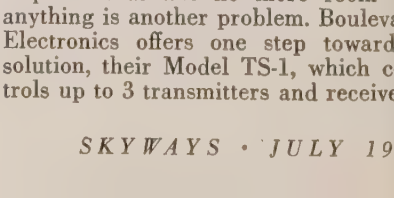
Transmitter Selector Switch



A hodge-podge maze of switches is the familiar problem faced by many business plane operators as they keep adding equipment to stay abreast of the increasing airways requirements. The ideal set-up is to combine the switches for several pieces of radio in one panel.

To make it small enough to fit in an airplane that has no more room for anything is another problem. Boulevard Electronics offers one step toward a solution, their Model TS-1, which controls up to 3 transmitters and receivers

The entire unit measures 2" x 1-¾" x 5" and it all mounts in one ⅜" hole.

By simply turning one knob to any one of 3 positions, you automatically connect your microphone to the selected transmitter, and at the same time connect the one and only required transmitting antenna to that transmitter. When you depress the mike button, you automatically silence all of your receivers and transmit on the selected transmitter, completely eliminating all howls and feedback.

Each of the antenna cables has an injection moulded plug fitting to resist breakage of the coax leads and, at the same time, provide a nice grip for easy removal from the set.

Circle No. 51 on Reader Service Card

Flush Antenna System for Aero Commanders

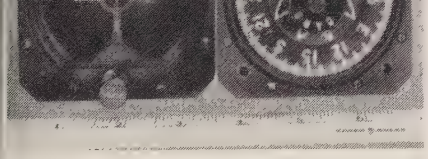
As the cruising performance of our business aircraft continues to mount, more and more penalty is attached to the old clothesline and aircatching horn type of radio antennas. Jets have long since gone to flush systems. The main advantages to flush antenna system are (1) No danger of losing antennas in icing conditions; (2) Improved Omni and Communications performance; (3) Less drag, hence cleaner airplanes.

Aero Commander has thus taken another tremendous step forward reminiscent of their introduction of pressurization to the light twin field, by burying the communications and navigation antennae (less sensing antenna) in wing tips and vertical fin.

Transistorized Doppler Development

Collins Radio is developing a transistorized airborne doppler navigation system, called DN-101. Prototypes are expected to be flying in Collins aircraft by late 1958. Production deliveries are expected to begin in the latter part of 1959.

Two New Air-Driven Instruments



Aviation Instrument Manufacturing announces development of two instruments, each of which is the smallest, least bulky and lightest of its kind air-driven instrument in production.

The AIM Model 213 Directional Gyro (pictured on the right) is all new, while AIM Model 643-S Horizon Reference Indicator (pictured on the left) is a redesigned and improved version of the AIM Model 643. Their low air consumption, small size and bulk—together with high performance characteristics, adapt them to dual flight group applications, and to aircraft of any size. They are both virtually spillproof and offer all desirable features of the electric instruments, while being marketed at a moderate price for each.

New GE Warning Lamp

A new sealed beam lamp for use in red rotating warning lights is designed to reduce maintenance costs, claims General Electric's Miniature Lamp Department.

Designated No. 4613, the lamp's strong filament will withstand better the shock and vibration of aircraft service than its predecessor, No. 4594.

A retail price of $5.60, federal excise tax included, is suggested.

Suite 344

(Continued from page 8)

still without NBAA representation are El Paso, Ft. Worth, Miami, Memphis, New Orleans, San Antonio, Chicago, Jacksonville, Norfolk, Kansas City and others.

DEADLINE FOR COMPANY AND PILOT SAFETY AWARDS (AUGUST 15, 1958)

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Come to see us at National Headquarters.

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BONANZA with TACTAIR AUTOPILOT

Selected by Beech as Optional Equipment

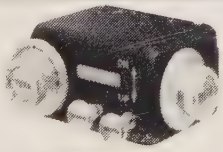
There's a new thrill in flying when you switch on the Tactair Autopilot in the Beech Bonanza. Smoothly, effortlessly, the Tactair's pneumatic system holds you straight, precisely on course or makes perfect turns.

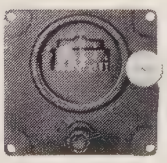
And there's new ease in flying the Bonanza cross-country, thanks to the Tactair's amazing heading lock which makes flying VOR, ADF, or ILS localizer a cinch.

New 1958 Bonanzas can be ordered with the Tactair installed at the factory, to bring you this ultimate perfection in flying ease and safety. If you already own a Bonanza (Model A on) the Tactair can easily be installed in the field.

There's no finer tribute to the Tactair's proven reliability and performance than Beech's choice of Tactair—first autopilot ever selected by Beech for the Bonanza as factory-installed equipment.

A FAR SUPERIOR AUTOPILOT SYSTEM





The Tactair T-3 operates pneumatically with no warm-up, no power drain, no tubes—so mechanically simple, yet so "human," that it makes any other flight system obsolete. Weighs only 7.3 pounds, simple to install, virtually maintenance-free.

WITH TRUE-READING HEADING LOCK

Tactair's heading lock works on the DG with no confusing zero heading. Merely set the upper card to course desired and you fly that course precisely. No complicated resetting for new course necessary.

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Here is innkeeping
with a flourish.
Food with a flair.
And all sorts of
reasons for
enjoyment. You
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your plane before
you're there.
Where else could you
find food prepared
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room that will remind
you of Aztecs?
P.S. Be sure to ask us
about the Skyriders

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Circle No. 27 on Reader Service Card

Decorate for Safety

(Continued from page 13)

irrevocably grows. The only insurance that will reduce the risk *before* the event is increased conspicuity and this every pilot and aircraft operator can obtain for himself today. Neither the makers of Day-Glo or any other high-conspicuity paint that may follow their lead, will ever get rich on the aviation market. There just aren't that many airplanes and a mere gallon or two will adequately mark most of them. BUT, the dividends in personal safety and avoidance of the probability of becoming a quoted "statistic" are very great.

In December 1957 a Skyways report on the paint produced a surprising response, indicating a fast growing interest in the safety and esthetic values of this paint. A few queries quoted a widely spread impression that the fluorescent qualities of the paint deteriorated rapidly under continued exposure to sunlight, particularly in the southwest. With the agreement and cooperation of Switzer Bros., Skyways located a business aircraft that was known to be headed into Mexico and Central America for a 3-4 month sojourn. The owners agreed to allow their aircraft to be the guinea pig for a severe test of the durability of the paint. The control surfaces of the aircraft, a Bonanza, were painted Blaze Orange by Mattituck Air Base, Inc. of Long Island, N.Y., and Linden, N.J., also cooperating in the test.

For the succeeding four months the airplane was either soaking in the sun at various Central American fields where shelter was non-existent or in the air in the same area and also the southwestern states where the highest percentage of sunshine is known to prevail. On return to the New York area, immediate photographic and light meter tests were made of the painted surfaces and compared with freshly painted samples of the same paint. Despite the fact that the subject surfaces were unwashed (by agreement) and wore an absolutely untouched coat of accumulated dust and grime, there was no detectable difference in the reflective qualities of the tested surfaces! There was a distinguishable slight difference in shade between the almost blood-orange of those portions of the flaps sheltered by the rear edge of the wing surface and the exposed areas. The latter were uniformly a shade lighter but as far as could be detected, the reflective qualities were, if anything, enhanced (characteristic of the lighter Day-Glo shades). There was no bleaching or splotching, and adhesion was 100%. By contrast, the original factory enamel on the balance of the airplane had suffered considerably under the severe exposure test and plans are now afoot to repaint the rest of the airplane employing the high conspicuity paint as a key part of a highly esthetic design.

There are some words of caution to be said about the subject about applying the paint. Fred Switzer emphasizes that for ideal or best results the proposed areas should be stripped. Many aircraft enamel jobs of earlier years were not properly bonded to the aircraft surface and the Day-Glo process involves a comparatively heavy coat. Obviously the upper layers of paint will only be as durable as the undercoats, and will disappear with them as weaknesses inherent in the earlier paint process show up. Air Force tests flying jets through heavy weather demonstrated that properly-bonded paint would not erode or crack off under impact of ice and heavy rain. Switzer recommends Alodyne treatment of the bare or stripped aluminum skin as a must for a successful painting.

Although the current anti-collision emphasis is creating a tremendous demand for the paint, the company also recommends that it be definitely determined that the special techniques for preparation, prime undercoating, application and over-coating (of the required Filteray material) are clearly understood and followed by competent and established aircraft paint shops. Hasty preparation and application could destroy both the properties and the tenure of the paint.

The question of time and labor costs inevitably come up and it is pointed out that the Air Force, which has gone in extremely heavily for the markings on their aircraft, average 13-14 hours per single engine jet and trainer aircraft and only proportionately more with the larger multi-engine aircraft. Where control surfaces are to be painted and rebalancing is required, anticipated costs for this purpose should be estimated carefully.

The company has kept a close eye on the distribution, sale and application of their product with some concern for the just reputation of the name under the sudden pressures of the events of the last few months. Other manufacturers are struggling to enter the "demand" market, but the Switzers are determined to keep the advantage they hold. Their trademark name "Day-Glo" has become a household word in the field, and competition will have a hard struggle breaking down the widely held belief that safety in the air and Day-Glo are synonymous terms.

The times warrant an enthusiastic endorsement of the earliest possible application of high conspicuity paint to *all* aircraft, as a "crash" program to meet the demand for immediate action in the interests of safety.

(We have just received word that one manufacturer, Forney Aircraft, modernized Aircoupe, is delivering all aircraft to customers with Day-Glo markings unless otherwise requested.)

Round Table

(Continued from page 39)

partment now. We're taking the S-series type ignition system which is now on small engines.

Musacchio: What about the promise of this so-called high frequency ignition system?

ampbell: It's being run now at Wright eronautical on full scale test. It is esigned expressly for one specification.

lusacchio: What are the advantages of he high frequency over the low tension ystem?

ampbell: We expect to improve the verall performance, particularly spark lug performance.

lusacchio: Is that a condenser discharge system?

ampbell: Yes.

ngram: A high tension question regarding a distributor finger . . . On a 800B Scintilla we've run into a siege f burning right through into the retaining nut that the finger retaining late is held to. Do you know of any fix e can come up with since the later ype fingers are not available? How bout neoprene rubber being put in here with the 47 Compound?

ampbell: That wouldn't hurt it any. Moisture problems are with us. We've ound that the higher tube, or plug, has one much to improve the situation.

nderson: As light aircraft engines become higher powered, they are being equired to fly at altitudes and in eather conditions they were not required to fly in previously. Their severe y of ignition operations and problems re going to increase accordingly.

isher: In my considered opinion, after stening to the troubles and problems f aircraft engines, I feel that 80% of hese problems are caused by spark lugs and that some means should be ound to replace spark plugs. This has een accomplished by a new electronic evice which should be available within he next six months. You oil fellows will robably appreciate it because you won't need very high octane fuel with . We've been running tests for the ast four years on the latest automotive quipment.

Ignition Analyzers

ampbell: Getting on to the last topic, here are several ignition analyzers on he market. Used properly, the analyzer s a great help. It takes time and training to get the most from the investment.

ovac: As far as the analyzer is concerned, unless the operator uses it constantly so that he becomes very familiar with good patterns, he should not use t at all. In short, he should not wait until trouble occurs before looking at he analyzer but should constantly monitor his analyzer in order to know what hould be seen when the engine is running properly. Also, the analyzer will elp some operators to determine that he engine is functioning satisfactorily. With some analyzers you can actually ind sticking valves, poor combustion, tc. Used intelligently, the analyzer aves a tremendous amount of money.

mith: The operator must be familiar with the analyzer. He must monitor it ll the time so that he is well aware of he difference between the good pattern nd the bad pattern. But he mustn't continually read the thing as he does an engine instrument, so that if he doesn't see the exact reading that he wants, so o speak, he goes to maintenance. He nay see an unusual pattern, but he has to be familiar enough with it to know if it's worthy of attention.

Campbell: Some of the different manufacturers of analyzers have service schools to train operators at the factories, or in some cases, in the field.

Anderson: The analyzer has more or less been accepted as a required need by air lines with their larger, more complex equipment. In case someone might get the idea of buying one to put on their Tri-Pacer, it is primarily intended for complex ignition systems so that you can trace down and pin-point that trouble in the ignition system much quicker than by any other means.

Campbell: There are a number of operators who will buy analyzers to serve their customers. They will save the aircraft operators and/or owners money by use of the analyzer as a portable hook-up unit.

Foster: Has anybody had experience with vibration pickup on the analyzer?

Mecca: We use it as a development tool. Our engines are generally checked all through the development program with vibration pick ups. We can pick out valve bounce and general engine problems beyond the ignition system.

Kovac: The military insist on a valve check every 400 hours of engine operation. We're doing this on their Convair aircraft. They have been sold on the idea of checking valves using the vibration equipment. As a result, we have used a portable harness which we attach to an engine in about two to three hours. Valve timing is checked dynamically. Only those valves are readjusted that are found outside the limits.

Hermann Waker (*Aerodex*): We use the vibration pick up on all the military 2800 engines. It has certainly proved itself. You can pick up fouling troubles in a minute.

Thin vs. Electrodes

Kovac: One subject not yet covered is thin electrodes versus massive electrode

(Continued on page 52)

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IN THE BUSINESS HANGER

■ **HORTON & HORTON CUSTOM WORKS INC.,** Fort Worth, Tex., completing interior redecorating of Tennessee Gas Transmission's Widgeon and Martin B-26. Tony Zuma is TGT's aviation director.

New Mexico Timber Co.'s Beech D-18 in for turquoise, off-white and cocoa interior color scheme. Couch modification features four removable armrests, storage door and ice chest under sectional couch cushion. Paul Weber is chief pilot.

Bell Helicopter's model 47-J Rangers are getting 1959 interior styling.

Forest Oil Corp.'s Lodestar received an interior re-design in dove greys and eggshell white fabrics.

■ **POTTER AIRCRAFT SERVICE, INC.,** Burbank, Calif., completed 100-hr inspection on Columbia-Geneva Steel Corp.'s Lodestar, and made single piece windshield installation. Chief pilot, Jim Richter; co-pilot, Norm Mahaffey.

Signal Oil & Gas Co.'s DC-3 in for 100-hr inspection and application of Day-Glo paint markings. Chief pilot, Orlin Sorensen; co-pilot, Roy Nielsen.

Laura Scudder Products' Apache had 100-hr inspection and Day-Glo paint markings. Dean Miller is chief pilot.

Occidental Petroleum Corp.'s D-18S had periodic inspection. Chief pilot is Vic Russell.

■ **REMMERT-WERNER, INC.,** completed an engine change at Toledo on National Laboratories' D18S. Pilot is Robert Brown.

Monsanto Chemical Co. had a Collins 17L-51X VHF transceiver installed in one of their DC3s. Ralph Piper is chief pilot.

Trailmobile's Lodestar came to Lambert Field, St. Louis, for engine change. Carl Siemer is the pilot.

Trostel Leather Co.'s E18S had an Engine Works engine installed. Rick Ravitts is pilot.

Norman B. Woolworth has new R-W Super-92 DC-3 with Sperry autopilot with approach control, Bendix X-band radar, Collins 17L4-51X communications, dual Collins 51R omni with dual RMI and Integrated Flight System, special interior and other equipment. Seth Boynton and Norman Danagher delivered plane.

Owens-Illinois Glass Co. had both of their DC3s at R-W Toledo for installation of Bendix RA18 360 channel VHF receivers, with 50 kc spacing, and Narco Sapphire 1016 360-560 channel 50 kc transceivers. Dick Rigg is chief pilot.

The Peabody Coal Co. Super-92 DC3 had installation of dual A.R.C. Type 21 lightweight ADF, Collins 51R3 omni with dual RMI and Bendix Omni Mag, Collins 17L4-51R3 communications, Sperry C6 gyrosyn compass and H5 electric gyro horizon, and custom radio, electrical and instrument panels. Bob Boyanowsky and Bill Frame are the pilots.

Olin-Mathieson's DC3 had 55 pounds of weight removed by installation of new carpet and special padding during a 100-hr inspection.

Offshore Drilling's DC3, flown by Lee Snow, was in for an annual inspection and installation of a trailing antenna.

■ **DALLAS AERO SERVICE,** Love Field, Dallas, Tex., is converting a Sinclair Oil Co. Lockheed Lodestar to DAS Speed, Stability and Safety Program Kit installation. Pilot is Joe Lacy.

Denver Chicago Truck Line's deHavilland Dove was in for an engine change and other work. Pilot is R. C. VanBuskirk.

Shell Oil Co., Los Angeles, had their deHavilland Dove in for a double engine change, complete new power system and other work. Paul E. Jones is the pilot.

American Home Realty Co. had its Aero Commander in for a double engine change. Henry Bird is the pilot.

Ibex Co.'s Aero Commander had a Federal autopilot installed. J. D. Ferrell is the pilot.

Phillips Petroleum Co. had its DC-3 in for a double engine change.

■ **SKYMOTIVE, INC.,** O'Hare Field, Chicago, Ill., completed re-wiring Greenlee Bros. DC-3.

Rhinelander Paper Co.'s D-18 received 1,000-hr inspection and new double cabin windows.

Toni Co.'s Lodestar had the right engine changed.

Pure Oil Co.'s D-18 was flown in for installation of an Airline Safety Performance kit, air stair door and a new interior.

Essex Wire's Lodestar underwent Pac-Aero modifications consisting of bat wing and flap track removal, raising of the stabilizer and installation of new fiber-glass saddle and inter-sectional fairings.

International Harvester's DC-3 was equipped with Bendix X Band radar.

■ **QUALITRON, INC.,** Lockheed Air Terminal, Burbank, Calif., installed Bendix RDR-1B radar in Union Oil Co.'s Convair. Jim Stevenson is chief pilot.

Signal Oil & Gas Co.'s Aero Commander received an RCA radar installation. Pilot is Ray Vertal.

Sears, Roebuck and Co.'s DC-3 had complete major radio system installation made. Pilot is George Fleming.

Fluor Corp.'s Lodestar received radio system engineering, re-wiring, communication—navigation equipment additions and other modifications. Pilot is Harry Conover.

Fred J. Early Jr. Co.'s Twin Beech received a complete radio system installation. Barney Evart is the pilot.

Mellon National Bank's Lodestar had Bendix RDR-1D radar, dual ARC Type 21 ADFs and a new inverter system installed. Roy Weiland is the pilot.

Bethlehem Steel Corp.'s second Convair 440 had extensive equipment deletions, additions and radio system modifications completed. Al Junker is pilot.

Richfield Oil Corp.'s DC-3 received a major radio system installation plus edge-lighted control panels. Joe Brown is chief pilot at the Burbank base.

Imperial Oil Ltd., Toronto, had Bendix radar system installed in their Convair 240. Milt Middleton is chief pilot.

Belridge Oil's D-18 Beechcraft had completely new radio communication and navigation system installed including Collins VHF Communications, glidescope and marker systems, etc. Len Mills is pilot at Burbank base.

■ **FIELD AVIATION,** Oshawa, Ont. Canada, completed modifications on Combined Enterprises Ltd.'s Super 18 Beechcraft including DC-3 type windshield spray anti-icing system.

Lundberg Explorations Ltd.'s Mark V Anson is undergoing extensive modification to electrical and hydraulic systems.

Dept. of Mines and Technical Surveys has their magnetometer-carrying Canso in for overhaul and renewal of its C of A.

■ **L. B. SMITH CORP.,** Miami International Airport, Fla., installed new engine and new seats in Associated Air Transport's Smith-Super CW20-T.

Royal Management Co.'s Twin Bonanza had new engines and propellers installed.

American Snuff Co.'s Super E. Beech had electrical system converted.

Brazilian Aeronautical Commission's SA-16 Grumman "Albatrosses" are in for rehabilitation for air-sea rescue, training ground and flight crews.

Minnesota Airmotive Co.'s Super Lodestar is in for engineering and flight testing of this prototype.

■ **PLANESERVICE, Inc.,** Van Nuys Airport, Calif., installed Narco Saphire 1016 and ILS system in Aero Commander and Lear Omni System in Cessna 172 belonging to Central Western Telephone Co. of Taft and Bakersfield.

Consair Flyers Club of San Diego has a Narco VHT-3 Transmitter installed by Planeservice Radio Dept.

Hehr Mfg. Co. of Los Angeles had one of the largest possible radio packages installed—three omnis, two ADF's, four localizers, primary & secondary communications, 3 Lite Marker, Glide Slope and audio isolation, complete with Autopilot—weight 300 lbs.

H. C. Smith Construction Co. flew in for installation of Narco VC-27 in new J-3 Bonanza.

Robert Harbison, newspaper publisher of San Bernardino, had an ILS system installed in his Bonanza.

Richard Morgan, of Beverly Hills, had dual omni receivers and an ADF installed in his new Travel Air.

Judge Rey B. Schauer, Associate Justice of the Supreme Court of California flew his Bonanza to Van Nuys for repair of his Autopilot.

■ **PIEDMONT AVIATION, INC.,** Winston-Salem, N. C., performed 100-hr inspection on E18S, owned by R. J. Reynolds Tobacco Co., and flown by Grant Jefferies.

Krispy Kreme Doughnut Co. had their E18S in for 100-hr inspection and misc. repairs. Pilot is Rex Beamer.

Daytona International Speedway Corp. had their PA-23 in for 100-hr inspection.

Smith Transfer Corp. flew their E18S for 100-hr inspection and misc. repairs.

McLean Trucking Co.'s pilot, Roy Lakefield, had 100-hr inspection performed on the company's E18S.

R. J. Reynolds Tobacco Co.'s Chief Pilot Herb Drew had misc. repairs performed on the company's DC-3.

Corps of Engineers pilot, Ed Haffey, flew their DC-3 in for 100-hr inspection and misc. repairs.

Management Service flew their DC-3 in for 100-hr inspection. Pilot is J. E. Wilson.

PACAERO ENGINEERING CORP., Santa Monica Airport, Santa Monica, Calif., completed installation of rudder spring tab system on a Bechtel Corp. Lodestar.

Sangamo Electric Co.'s pilot, Ross Bennett, brought in one of their Learstars for annual inspection and relicense.

Utah Construction's Learstar was flown in by Doug Garneau for minor service work.

Solo Cup Co.'s Learstar was flown in by Floyd Rondeau for 100-hr inspection and other misc. work.

Westinghouse Air Brake Co.'s Lodestar was in for dual engine change, installation of short stack exhaust system, rudder spring tab system, 100-hr inspection, electrical re-wire and other work. Frank Mills is chief pilot.

SPARTAN AIRCRAFT CO., Tulsa, Okla., completed general repairs on Wood Oil Co.'s Cessna 310.

Northern Natural Gas Co.'s Lockheed Ventura had inspection of landing gear, and radio and distance measuring equipment. W. S. Mackie is pilot.

C. L. McMahon had a periodic inspection, and general modifications performed on his Beech D18.

Corning Glass Work's pilots, Bowen and Prestion, brought their Douglas DC-3 in for installation of cabin chairs and repairs to its Janitrol heater and control system.

Humphries Construction Co.'s Sparton Executive, piloted by A. C. McDonald, received a periodic inspection and minor repairs.

M. A. Hanna Co.'s Lockheed Ventura had installation of Collins 51V-3 Glide Slope Receiver and Sperry pictorial indicator, 100-hr inspection, and general repairs. Jim Gott and Ole Burton are the pilots.

J. R. Sharp Drilling Co.'s Beech D-18 was brought in by Jay Gentry for horizontal stabilizer modification and minor repairs.

Tidewater Oil Co.'s Lockheed Lodestar, piloted by Al Scarlata, received a periodic inspection of aircraft, engines and instruments.

Indian Drilling Mud Co.'s Lockheed Ventura, piloted by Jim Wade, was in for general repairs and inspection.

G. E. Humphrey Construction Co.'s Spartan Executive was brought in from South Dakota for miscellaneous repairs.

Oriental Refining Co.'s Beech D-18 had minor aircraft repairs and a 100-hr inspection. Walter Reese is the pilot.

Northern Natural Gas brought their Beech D-18 in for a periodic inspection of aircraft, engines and instruments.

Tennessee Gas Transmission Co.'s Cessna 310 is back in service after their pilot, J. P. Jacobsen, brought the aircraft in for repairs to its Lear transceiver.

■ **EXECUTIVE AIRCRAFT SERVICE, INC.,** Dallas, Texas, completed radar repairs on Auto Transport's Super Ventura brought in by pilot Joe Snelson.

Sohio Oil Co.'s Lodestar had radar repairs. Pilot is "Buss" Finefrock.

S. W. Richardson's DC-3 was in for 100-hr inspection & misc. repairs. Pilot is Ed Armstrong.

Atlantic Refining's DC-3 was brought in by Herb Hansen for 1,000-hr overhaul, engine change, installation of aileron gap closure, new electrical wiring with 200 amp generator system, hydraulic panel modification (lowered), and misc. repairs & installations.

International Petroleum's DC-3 is back in Bogota, Columbia, S.A. after 1,000-hr overhaul; installation of radio equipment, flush JATO, aileron gap closure; overhauled landing gear, fuel tanks, control surfaces, etc.

Esso Shipping Co.'s Convair 340 had annual inspection, landing gear overhaul, installation of heater and APU and radio equipment, misc. repairs and exterior paint.

Gulf Interstate Gas Co.'s Lodestar had annual inspection, misc. repairs, and installation of overhead cockpit window. Pilot is Varge Pfuehler.

Gulf Oil Corp.'s Lodestar, piloted by Stein Lee, had annual inspection, misc. repairs, and installation of rudder spring tab kit.

Wilshire Oil Co. of California's Lodestar was brought in by pilot Clint Seccombe for 100-hr inspection and misc. repairs.

Trinity Drilling Co.'s Lodestar, piloted by W. L. "Poddy" Parish, had new cabin interior trim installed and misc. repairs.

S. W. Richardson's DC-3, piloted by Jim Smith, was in for annual inspection and misc. repairs.

Union Producing Co.'s Twin Beech had new exterior paint job. Pilot is E. P. "Cotton" Jeter.

■ **OAKLAND AIRMOTIVE CO.,** Oakland Intl. Airport has just made delivery of a converted PV-2, which they have named the CENTAURUS, to The Le Franc Corporation, San Francisco.

Industrial Indemnity's Lodestar and **The House of Harvey's** Apache were in for partial exterior painting with Velva-Glo.

Bechtel Corporation's Lodestar 221B was in for interior rework and galley modification. They now have Lodestar 222B in for electrical rewire and radar installation and galley modification.

Boquillas DC-3 in for a landing gear door modification. Pilot is Jim Gray.

Peter Kiewit's Cessna 310 brought in for a double engine change. Trace Toovey is pilot.

Pacific Bridge Co.'s Cessna 310, piloted by Elton Stone, was in for an auxiliary tank installation.

Rick Helicopter's Scann 30 Super Widgeon Conversion was in for a fuel tank repair and elimination of generator and magneto radio noise.

■ **GARRETT CORP.'S AIRESEARCH** Aviation Service Div., Los Angeles International Airport, has Republic Aviation's DC-3 in for installation of new radio, executive interior and AVQ-10 radar. Chief Pilot Pete Collins brought in the plane.

Pratt and Whitney, Convair 340, piloted by Ralph Borden with company representatives Walt Pager and Roney Officer on board, was in for AVQ-10 radar system and miscellaneous service items.

Tobin Aerial Surveys, DC-3, received radar maintenance and miscellaneous service work.

Phillips Petroleum, DC-3, flown in for installation of an executive interior, radio modification work, and 8,000 hour overhaul.

Dye Oxygen Co.'s twin-engine Beechcraft, brought in by Pilot Bob Witter, for 100-hr check, annual re-license, radio work and miscellaneous modifications.

Richfield Oil Co.'s DC-3 had aileron boost system installed and purchased Maximizer aileron gap strip kit and exhaust system.

Ford Motor Co.'s DC-3 had Maximizer installed, including gap strip kit.

■ **SOUTHWEST AIRMOTIVE CO.,** Love Field, Dallas, Tex., completed an inspection of Cummins Engine Co.'s DC-3. Pilots are Bill Pruner and Phil Kaufeld.

Dresser Industries' PV-1 brought in by Chief Pilot Larry Montigny, had a 100-hr inspection.

Vicksburgh District Corps of Engineers' Grumman Mallard was in for double engine change and minor repairs. Pilots are Bud Clesi and "Tink" Tinkham.

Gardner Denver's Piper Apache was in for 100-hr inspection, flown in by Pilot Keith Winship.

■ **VAN'S AIR SERVICE, INC.,** Winona, Minn., completed 100-hr inspection of Jack Kelly's Temco Riley.

Dison & Krofchalk's Bonanza had an engine major, 100-hr, paint job, and Hartzell prop and radio installation.

J. R. McCabe, Donaldson Construction Co. and Joe O'Neil had periodic inspections of their Navions.

National Insurance Underwriter's Bonanza had a periodic.

Miscellaneous repairs and radio work were accomplished on Northern Engraving Co.'s Cessna 310, National Can Retinning Co.'s Apache, Giddings & Lewis Co.'s Lockheed Lodestar, St. Paul Agency, Inc.'s Bonanza, and Ted Armit's Bonanza.

■ **GREENSBORO-HIGH POINT AIR SERVICE, INC.,** Greensboro, N. C., installed dual omnis on Andover Aviation's Cessna 195.

Carolina By-Products' Bonanza in for 100-hr inspection. Flown by President Stanley Frank.

J. J. Ryan's B-25 in for engine inspection, also Beechcraft G-35 for 100-hr inspection. Charles Bing, pilot.

(Continued on page 60)

Safety Digest

(Continued from page 35)

he could, even though he didn't understand why the instructor wanted the brakes on while still in the air . . . "break it" was flying talk that he'd heard used in a recruiting movie, but he hadn't yet reached the point of learning what to break. No one had told him.

In one P2V squadron, they had to convince several radar operators to stop asking for permission to "fire up the radar" after one pilot heard only the two words "fire" and "radar." This same squadron was the one in which a pilot was saying, ". . . in case you have to bail out . . ." when a man put his headphones on, heard only the last two words, and was halfway out the hatch before someone grabbed his collar. Seems he had a harness on but no chute.

A Cougar ran off the end of the runway when he aborted his takeoff upon hearing an urgent "Ten, hold it up." Tower wanted another aircraft, also No. 10, to stop taxiing. Scratch one main gear.

And the old handy thumbs-up-signal! Boy, that can sure get airplanes and people into predicaments in a hurry! Thumbs-up has come to mean just about everything except that you have no thumb. It's used to mean "up," "Roger, I understand you," "yes, I hear them screaming at us," "all's well," "climb," "look up there," and "look, my thumb is bleeding." Unless you're accustomed to what thumbs-up means from a certain individual, you can't depend on it much anymore.

While conducting some undercover research on the subject of misleading instructions and words, we ran into a dilly without even looking for it. Taxiing along one recent moonless night we asked the copilot, "Do I turn left here?" He immediately answered with a laconic, "Right." With our thumbprints still on his throat, he then amplified his meaning—that's right (oops, that's correct), he wanted us to turn left.

Human response to stimulus has an important relationship to commands, especially in moments of mental stress. Take the case of the student who was having trouble in the air—the chase pilot said, "pull up!," and the pilot immediately ejected. He insisted, later, that he had heard the words "bail out," and the chase pilot insisted he didn't say them. What most likely happened here was that the student was ready to bail out, he was "primed" to hear the command just as you're primed to see the traffic light turn green after it changes from red to amber. And, when he heard the terse phrase, same syllables, same tone of urgency, he heard what he was expecting to hear and out he went.

Pilots who are in a position to offer advice to someone in an emergency situation might keep this in mind and, where possible, offer their advice in a calm, reassuring sentence rather than a short, harsh command that might "trigger off" an undesired response. Think of what you do when the neighbor's not-very-friendly pooch snarls in your path—you don't say, "Nice dog" in a harsh tone, that would trigger him off. You speak calmly and soothingly, even if you call him a no-good-mangy cur, because he responds to voice tone stimuli better than to words. Try it.

How far can we go in eliminating Cockpit Confusion? Theoretically, we could eliminate it completely if everyone said just what he meant in plain, standard language.

But we're not automatons and we rebel sometimes at attempts to make us say a standard, canned phrase. Listen to some traffic turning base next time you're in the tower and you'll hear much originality . . . "gear check complete" . . . "gear down and apparently locked" (No gambler, he) . . . "three in the green, pressure up" . . . "turning base, rollers and draggers in place" (hepcat, this one) . . . and occasionally an unimaginative conformist who says "turning base, gear down and locked."

Transferring actual control between pilots is another place where words and sign language break down frequently. Copilot puts his hands on the yoke momentarily, pilot says "got it?" and the machine bumbles along its own because the copilot thought the pilot said "got it." Pretty hard to go wrong if you do it the old corny way—rock the wheel, raise both hands, and watch for the other fellow to pat his head. Would completely eliminate one standard phrase—"but I thought you had it."

Let's get off your back and the tower operators' and take a look at the plane captains out on the line. Many of them have never had "Taxi Sense" as required reading, and their signaling gyrations would delight even the most avid ballet enthusiast. Here again originality is the bug, for who wants to guide a zillion dollar flybird into the chocks with corny old-fashioned signals, when a dash for flavor will lighten the hearts of weary pilots? So we get Nijinskys who flail the air with dramatic waving of arms while weary pilots groan or, yet, follow their signals right into an open gas pit. Plane captains and taxi directors, unite! Taxi signals were made standard for a serious purpose.

No, we probably won't ever standardize terminology or hand signals to an ultimate degree. But we can add an extra dash of common sense to some of the jargon and mystical hand-wavings that take place in cockpits and on the line. Like briefing a copilot whom you haven't flown with, for example, and telling him that after takeoff you'll raise the wheels and he's to bring back the throttle to 30" when you turn them loose.

And like using standard, Navy-wide accepted terminology that leaves no doubt. IFR means Instrument Flight Rules, and if you start referring to In-flight Refueling as IFR, someone's gonna be embarrassed! Same as TOT—what do you call it takeoff time, time over target, turbine outlet temperature? Does your squadron PIO get mistaken for pilot induced oscillation?

Whether you're a one-seater jet jockey or a Connie copilot, a tower controller or a substitute acting plane captain, a little common sense in the use of English—both the queen's English and body English, will go a long way toward eliminating that helpless feeling experienced by a senior pilot in an allied service who elected to take a waveoff and called for "takeoff-power." Yep, his flight engineer took off power—all of it. (APPROACH)

Round Table

(Continued from page 49)

spark plugs. As you know, in the R280 days right after the war, Pratt & Whitney strongly recommended that thin electrode plugs be used. In fact, they didn't even put massive electrode spark plugs on their approved list. They found that a leaner mixture could only be fired with the thin electrode spark plug. At that time, the airlines objected to this policy. They retorted that they did not operate that lean. As a result the massive electrode spark plug was approved, and it has successfully accomplished its job. Today, with the high powers demanded by the 335 engines, the philosophy is again being brought forth that a thin electrode spark plug has a place.

Anderson: It will depend entirely on what the operator demands of the engine and the spark plug. If an operator demands extreme high operating periods from his spark plugs, the manufacturer will be forced to go to platinum electrode materials. Up to 50 hours operation we feel that the nickel alloy massive electrode spark plug will do an excellent job.

Gossett: AC does not agree with that.

Church: Availability of platinum in time of emergency has been a consideration. Our findings, however, are that the jet age has increased the requirements for nickel rather than platinum. In addition to our own survey, one of our very large users also came to the same conclusions before switching to fine-wire platinum plugs. Another survey we made was on the amount of platinum that erodes away during service life. We learned that we don't lose too much platinum in 1,000 hours of operation. The remaining platinum can be salvaged for further use, thus replenishing the supply.

Anderson: We make both plugs, to We feel it's up to the operator to decide which type suits his requirements best. The platinum electrode plug has more or less assumed the definition of fine wire. As they are being gradually developed to the required needs of the extremely high-powered engines, they are ceasing to be fine-wire. We are having to use more and more electrode material to satisfy the job. They are, therefore, gradually becoming massive electrode types with premium in cost.

Gossett: AC reserves the prerogative to disagree with this.

Campbell: This concludes the program. Skyways' hospitality is appreciated and is the privilege of being with this group.

Maintenance Bulletin

These maintenance notes are compiled and edited from recent CAA air-carrier maintenance branch and general aviation maintenance summaries, and are mailed to all NBAA members as part of their membership service.

DOUGLAS

Model DC3, C-47—*Main Landing Gear Down Lock Assembly*—When performing maintenance on the landing gear, requiring the aircraft to be suspended on jacks or otherwise, visual inspection of the mechanical safety catches should be made before lowering the aircraft. On inspection, it should be ascertained that the latch is engaged in the slot on the lower end of the actuating cylinder piston rod. Further, when removing the gear down lock pins, it is considered good practice to check for engagement of the latch in the slot at all times.

Mode DC3—*Feathered right propeller* after takeoff, account fire warning. CO-2 used. Three minutes single engine time. Inspection revealed electrical overheat of starter relay in "J" box right nacelle during pre-takeoff starting. Heat from relay charred fire detector wiring causing false warning after takeoff.

Cracked wing attach angles—DACO considers cracks to be caused by aircraft being operated on short range flights and at low altitudes where severe turbulence is often encountered. These conditions tend to reduce the fatigue life of the wing attach angles. Operator has removed the attach angle covers from all aircraft and the attach angles are inspected each No. 4 (380 hour) inspection period.

Fire warning left engine—Propeller feathered and CO-2 used. Inspection found no fire evidence. One fenwall detector on dishpan found shorted. Repairs made, CO-2 replaced and aircraft returned to service. Single engine time 5 min.

Right hydraulic pump inoperative—Found hydraulic shutoff valve in closed position. Investigation revealed taper pin connection shaft to bellcrank missing. Inspection of left valve revealed plain taper pin installed and peened to prevent pin from coming out. Fleet campaign in progress to inspect and replace plain pins with threaded pins for installation of a nut. First incident of this type.

Model DC-3A—*Engine backfiring*—Inspection found supercharger fuel drain inner connection, P/N 44682, and spring, P/N 44684, in No. 9 cylinder intake pipe. Engine was changed and overhaul agency notified.

Sense antenna mast broken from fuselage at skin line—lower part missing from aircraft, Douglas P/N 2132105. Mast replaced which consists of internal reinforcement to mast at mounting end.

Left engine lost power on takeoff run and quit when power was reduced. Disassembly inspection revealed failure of propeller reduction gear pinion, P/N 31143. Metal from gear failure circulated through engine causing initial stage of master rod bearing failure. Total time of parts involved 492 hours. First failure of this nature this year.

Model DC-3C—*Right propeller was feathered*—13 min. prior to arrival due to engine roughness and fluctuating oil pressure. Initial failure was No. 1 cylinder exhaust valve. Continued operation resulted in split cylinder head and hole in piston. Valve TT 1243:00 hours. Operator is holding exhaust valve stem to guide clearances to stricter limits and is conducting a fleet campaign on valve clearance adjustments.

Right propeller would not feather—Blades too tight. Left feathering motor burned out while trying to unfeather. Blades too tight causing poor synchronization. These difficulties have been traced to the propeller blade seal galling against the corrosion barrier on the blade shanks as called out in Hamilton Standard Service Bulletin No. 508 in compliance with AD-57-13-5 and Rev. 57-20. Operator has complied with SB 508 on 28 of their 36 propellers. WCA plans to remove corrosion barrier from all propellers as propellers are overhauled every 13 months and corrosion has occurred infrequently.

PIPER

Lift Strut to Fuselage Attachment Fittings P/N-14481—Piper aircraft are being found on inspection with approximately one-half inch of the threaded fitting screwed into the strut sleeve. It has been determined that a maximum of 15 threads can be exposed from the locking nut.

Model PA-23—*Rudder Tab Adjustment*, which threads into the cable controlled drum and connects to rudder tab, failed in the thread area immediately adjacent to the drum.

Carburetor Air Ducting from Muff to Air Intake—Ducting was found in a collapsed condition, resulting from fabric coming loose from wire stiffener. This condition was observed on both engines.

Fuel Line—Left auxiliary fuel tank line and airspeed static line were making contact in left wing forward of pitot tube.

Stack Assembly-Exhaust — Exhaust stack shroud end plate was found cutting into exhaust stacks, permitting exhaust gases and flame to enter engine compartment.

LEARSTAR

ADF Loop L-11 (ARC Serial 460)—Retaining shaft which passes through ferrite loop section became loose. This resulted in rubbing the glass, causing filings and fluid inside hermetically sealed unit. A ferrite loop having ex-

(Continued on page 60)

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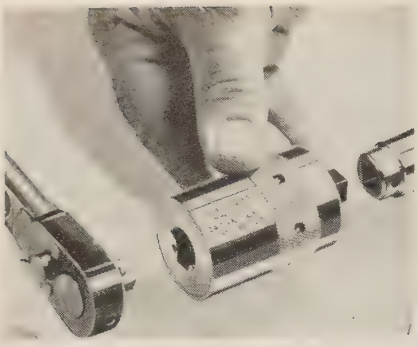
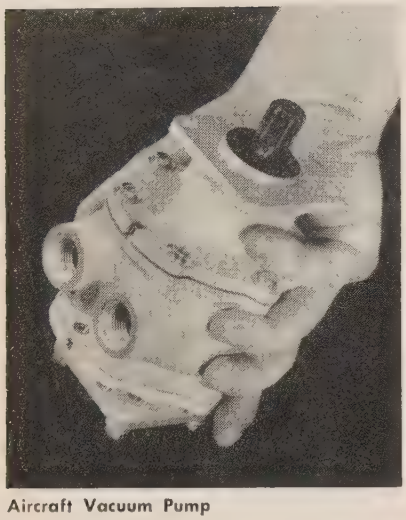
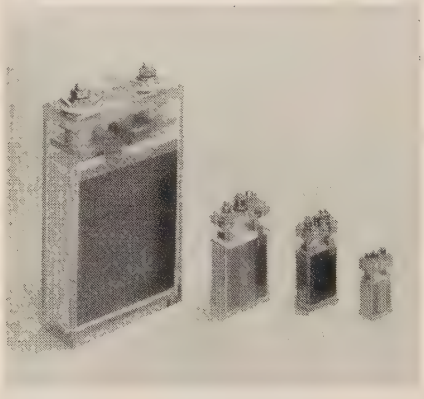


Compact Torque Tool



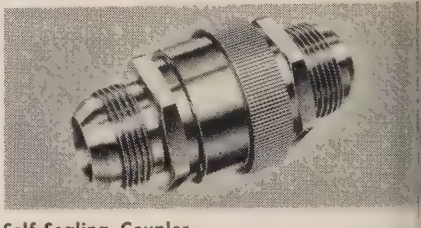
Aircraft Vacuum Pump

Runway Light



Nickel Cadmium Storage Batteries

Pilot Pocket Computer



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(Cont. on page 59)

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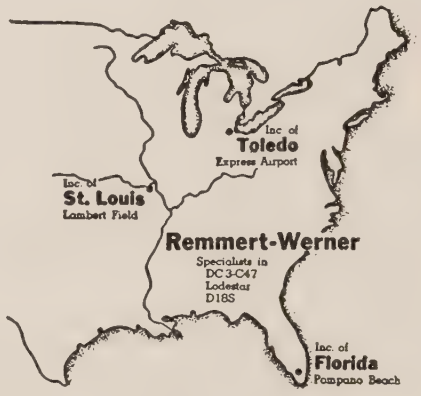

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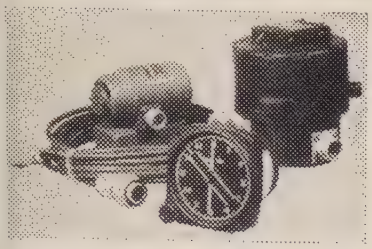

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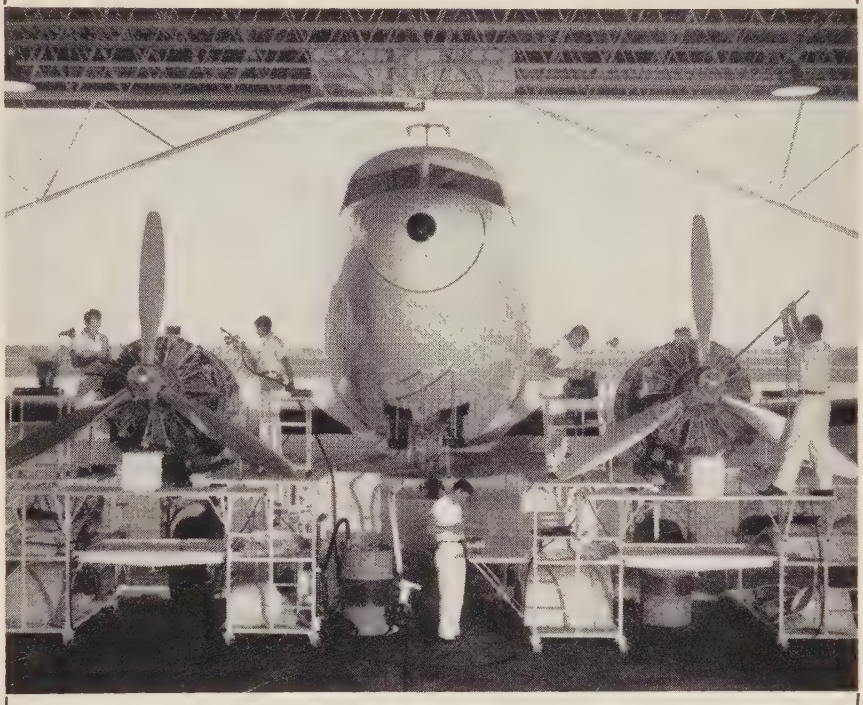

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Reduced for immediate sale C50 (Twin Bonanza) TT 2000 Hrs. E and P 400 Hrs. Dual equipment. Many extras. $39,900. D. F. Farabaugh, 1105 North Front Street, Niles, Michigan, MUtual 3-0200.

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AVIATION Charts now available from our new Chart Division. Agents for the Coast and Geodetic Survey. Our service includes Aeronautical Sectional, World Aeronautical, Direction Finding Navigational Flight, etc. Distributors for New Plastic Relief Map of the United States $45.00 express prepaid. (Free Catalog.) Pan American Navigation Service, 12021-22 Ventura Blvd., Hollywood, Calif.

MISCELLANEOUS

LETTERS AND NUMBERS—Precut self-adhering Vinyl REGALETTERS eliminate masking and spraying. Available in 4", 12" and 20". Also American flags, 8" x 13½". Permanent colors. Meets CAA regulations. See your Distributor or: REGAL AIR CORP., 500 Fifth Ave., N.Y.C.

nu-avi-quip

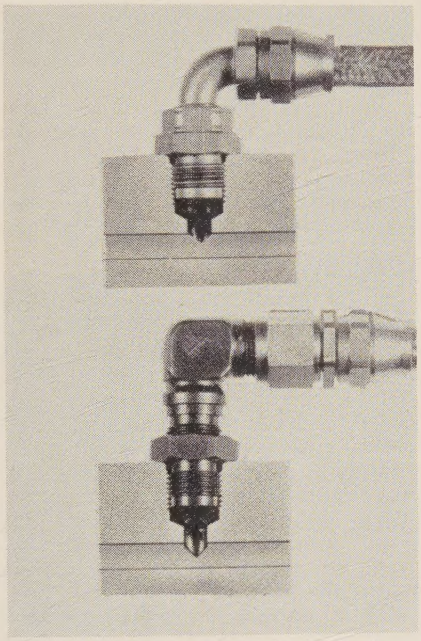
(Continued from page 54)

New Universal Boss Saves Weight

A great saving in weight (48% in ½" tube size) is one of the advantages of a new Universal Boss Fitting recently developed.

The bulky AN adapter commonly used has been eliminated. Universal elbow fittings may be positioned upon installation, thereby avoiding prepositioning and reducing steps.

The Universal Boss Fitting is available in both integral hose fitting and bulkhead adapter styles in aluminum and stainless steel.



Circle No. 40 on Reader Service Card

Aircraft Windshield Rain Repellent

A recent development is an improved Aircraft Windshield Rain Repellent. Manufacturer warns that a film of clinging water on a windshield can distort vision by a few degrees, causing the pilot to follow a false horizon level and underestimate his clearance of ground obstructions. Kits are available in two sizes.

Circle No. 41 on Reader Service Card

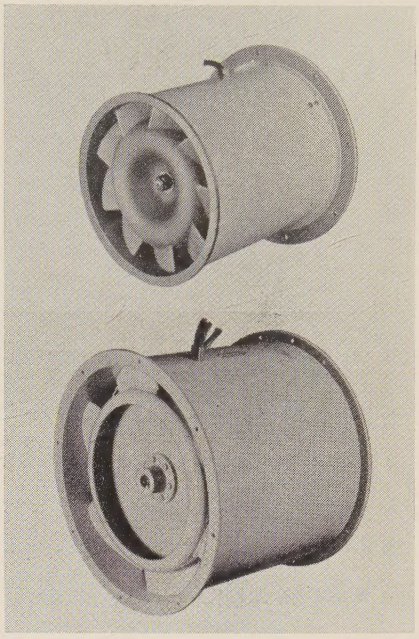
Unitized Fuel Control for Helicopters

A new unitized fuel control mechanism designed for helicopter powerplant installation is now being produced.

Circle No. 42 on Reader Service Card

Miniaturized Vaneaxial Blowers

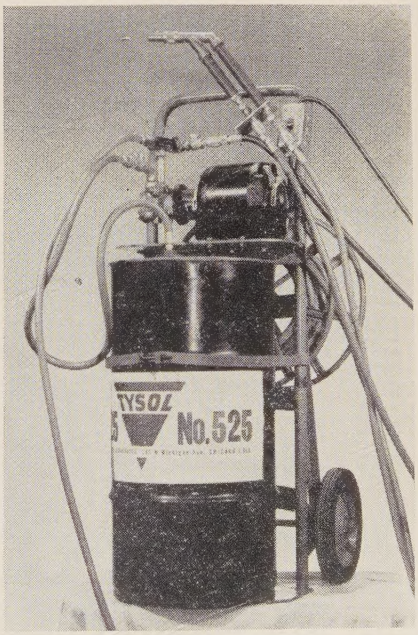
Compact vaneaxial air moving units for electronic equipment cooling, where space is critical, are now available. Single-stage blower, top, is high efficiency unit designed for cooling electronic equipment and inflating radomes. Typical two-stage unit, bottom, is designed for high pressure, low volume performance suitable for cooling Magnatron tubes in radar sets. The new vaneaxial fans can be furnished in a wide variety of housing shapes, sizes, flange designs, finishes and mounting arrangements. All are direct-drive.



Circle No. 43 on Reader Service Card

Portable Spray Cleaning Unit

A new method of spray cleaning with a portable Spray Cleaning Unit Model and Cleaning and Rinse Gun Model are announced by the manufacturer.



Major advantages are: controlled use of water; no heat required for cleaning and rinsing; cleaning time reduced, thereby more economical; more thorough and completely portable.

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$1785.00

180 CHANNEL
VHF TRANSCEIVER
118.0 To 135.9 MC

- All Accessories, Crystals, Antenna and Connectors furnished wired and assembled ready to install.
- Installed weight only 23 lbs.
- Transmitter power an honest 5 watts radio output.
- Size is standard ½ ATR.
- Control Head is Airline concentric type.

SPRINGER AIRCRAFT RADIO CORP.
Sky Harbor Airport
Route 11, Box 330
Indianapolis, Indiana

Circle No. 47 on Reader Service Card

Airplanes Wanted

WE WILL SPEND $450,000 CASH EACH SIXTY DAYS FOR CLEAN AIRPLANES

In our inventory for immediate sale or trade we have:

$78,600.00 Executive Lockheed Lodestar—Serial No. 2190—red and blue trim, white fuselage top—complete dual instrumentation—prop, carburetor and windshield alcohol anti-icing—24 volt system—plush executive interior—galley—lavatory—radio includes ARC R15 receiver—ARC CD1 course director with CA-10 computer—dual R-5/ARN-7 Bendix ADF—R89 ARN5A glide slope receiver—DTR 360A transceiver—Collins 17K1 transmitter—R8 ARN marker beacon receiver—BC783D localizer receiver—ARC F11 150 amp. isolation amplifier—Hamilton standard 23E50-471 props—1820-56 Wright engines with 469 and 222 hours since overhaul—3259 hours total airframe—just relicensed to March, 1959—also includes two spare engines, one zero time since overhaul and one run out—flown only by a professional pilot.

$64,700.00 Lockheed Lodestar—Serial No. 2039—N46F—has brand new CAA periodic—flown 285 hours during last two years—engines: Wright Model 18-20-202A's and have 285 hours since complete major overhaul—24V system—painted grey, white and blue in Learstar design—prop and windshield alcohol—dual Collins 360 channel 51R Omni's—very neat and complete dual instrumentation—dual Bendix ADF's—Collins 17L3 transmitter—Lear LVTR-36 standby transceiver—Bendix MN53A 3-light marker beacon receiver—dual R89B 10-channel glide slope receivers—isolation amplifier—useful load 5405 lbs.

We urgently need to reduce our inventory and would like to trade one or both of these Lodestars on D-18's—Aero Commanders—310's—or Twin Bonanzas.

Send Name and Address to Receive our Mailing List

BEECHCRAFT DISTRIBUTORS
JACK ADAMS AIRCRAFT SALES, INC.
TWINKLE TOWN AIRPORT
P. O. Box 5446 Memphis 16, Tenn.
Phones EX 1-4436,
EXpress 1-4437, EXpress 1-4438

Circle No. 48 on Reader Service Card

Maintenance

(Continued from page 53)

cessive play will cause erroneous bearing indications.

GRUMMAN

Mallard Model G-73—*Throttle cable*—In attempting to start right engine, pilot noted right throttle seemed to be quite loose and free to move. Inspection revealed the throttle cable was broken in the pulley area just above the throttle arm in the cockpit. Review of records indicated that advisability of establishing the maximum service life for these engine cables at 1600 hours.

Pre-flight inspection revealed hydraulic oil on the bottom of the left wing. Further inspection revealed that the wing flap up hydraulic line was cracked at a flare just inboard of the cylinder. Line replaced and ship returned to service. Inspection procedure established for more frequent detailed inspection of this area.

Main gear down lock cylinder leaking internally. Inspection revealed the "O" ring piston seal had deteriorated. Investigation with the manufacturer determined that the "O" ring used was non-standard.

LOCKHEED

Model 18-08—*Throttle cable*—After the landing roll out when pilot attempted to taxi off the runway, left engine did not respond to the throttle control. Investigation disclosed that cable to throttle was broken at firewall pulley swaged fitting. As a result of this and other instances of cable breakage, we have established the practice of putting new cables between firewall connections and the engine at each 1200 hours or engine change of approximately the same period.

Walk around inspection revealed rivets in wing skin aft of each nacelle with heads popped. Investigation showed that corrosive effect of the exhaust gases in this area were the cause. Procedure has been established for more frequent and detailed inspection of rivets and structure in any places that exhaust gases can contact.

Periodic Insp.—While performing periodic inspection, a crack in center section to fuselage attach angle P/N 51025 was discovered. New attach angles were installed and aircraft returned to service. Subsequent detailed examination of the cracked angles indicated that the most probable cause of the cracks was stress induced by installation of a poor fitting angle.

Model 18—*Angle*—Center Section Main Beam to Fuselage P/N-51025—Subject part (right and left) was found cracked in the base.

HELICOPTER

Bell 47G-2—*Tail Rotor Shaft P/N-47-645-202-1 and Bolt NAS-464-5-36*—Difficulty was experienced when operating rudder control. Inspection of tail rotor gear box disclosed that the bolt (NAS-464-5-36), which retains tail rotor hub, sleeve, and guide to the tail rotor shaft was in a near failed condition.

Bell 47H-1—*Vibration*—During e route at 1500', helicopter experience severe vibration in tail section. Durin investigation by Bell Aircraft Meta lurgical Laboratory, analysis reveale evidence of an in-flight collision wit a relatively soft object which apparentl had appreciable mass. They advise that the composition of the object wa not identifiable, but it could have bee of a cellulose composition or, possibly a bird strike in flight by the tail roto Bell is also of the opinion this incide could be attributed to tail rotor blad flutter because, due to this incident an several others, a mandatory bulletin wa issued for inspection of the tail roto and hub assemblies.

Bell 47-J—*Fuel Filter P/N-22372*—Fuel filter retaining bail failed when locking screw connects to bail. End

Business Hangar

(Continued from page 51)

■ **AMERICAN AIRMOTIVE CORP** International Airport, Miami, Fla., com pleted bat wing removal, Learstar-type ta group conversion, double engine chang and paint job on E. F. MacDonald Co. Lodestar. Pilots, Jack deWolfe, Al Block

Lyon, Inc.'s, Grumman Mallard ha 100-hr inspection and misc. radio work Pilots are Elmourza Natirboff and Gordo Elder.

F. Kirk Johnson's DC-3 was in fo minor repairs. Pilots are Robert E. Har ing Jr. and Robert Martin.

U. S. Industries' DC-3 had 8,000-h overhaul, electrical and radio systems re wired, installation of AA-designed electri "J" box, installation of honeycomb flo ing. interior refurbishing and new pain

Guillermo Bernal, Bogota, Colomb took possession of his AA-converted B-2 with executive interior, new paint job an special aerial photogrametric installatio

H. H. Bassett's deHavilland had a 100-h inspection and new paint job. Pilot is Bo Mulligan.

DuPont Air Interests' president an general manager, Hal duPont and Charle Raysor, took delivery of an Aero Com mander 560A and Aero Commander 68 which had received anual inspections an new paint jobs.

Flying Horse Farm's Super Navion wa brought in by Sumner Pingree Jr. for it annual inspection.

Packer Pontiac Corp.'s Grumman Ma lard had hull splash rails installed. Pilo is Bob Turner.

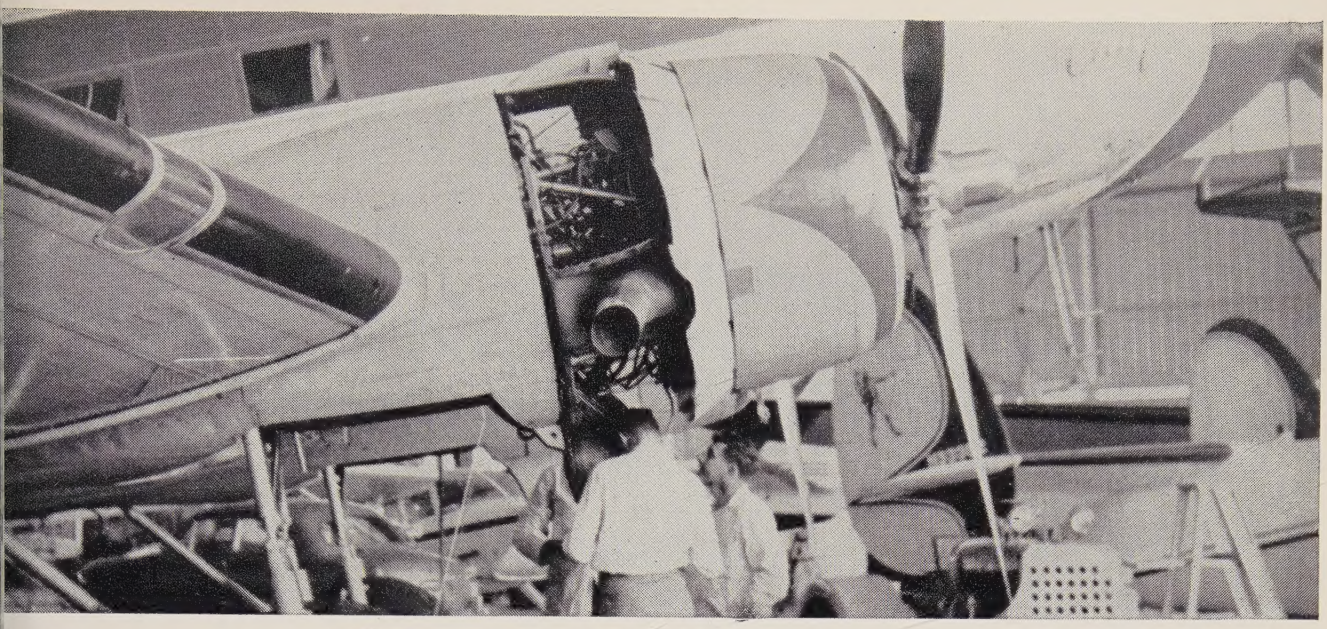
Stockton, Whatley and Davin Co.' Beech E18S and Beech C50 had misc. radi and engine repairs. Pilots are A. R. Jane and Ed Cowart.

Great Lakes Carbon Corp.'s DC-3 piloted by Bill Horan and Joe Greneir, ha annual inspection, double engine change

Plymouth Oil Co.'s Learstar had doubl engine change. Pilots are Jim Hickerso and Guy Phillips.

Cooperativa Algodonera Salvadoren had three Stearmans in for NA-75 conver sion (hi-lift wings, easily removable fuse lage metal panels, new type hopper, new type dusting and spraying equipment).

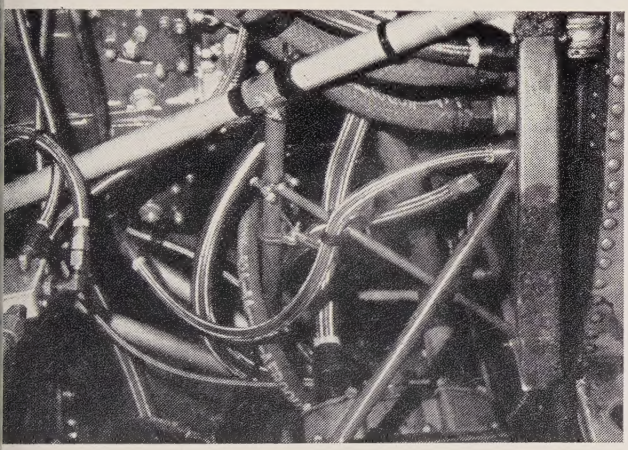
Hacienda Hotels' DC-4 is undergoin conversion including DC-7-type rear cabi lounge and piano bar.



A DC-3 type corporate aircraft equipped with Aeroquip Hose Lines.

DC-3 Engines Get New, Lighter 'Life Lines'

New Type Aeroquip Hose Lines Save Weight, Increase Fire Resistance, Extend Service Life



Close-up of a firewall section shows 666 Hose of Teflon with fire sleeving and 601 Lightweight Engine Hose with stainless steel braid cover. Together they offer increased fire resistance and longer service life on engine lines.

Teflon is DuPont trade name for its tetrafluoroethylene resin.

Use of new type Aeroquip Hose Lines offers important safety and service advantages to all aircraft operators. On a typical overhaul job, PW-1830-94 engines on a DC-3 were completely replumbed with Aeroquip 601 Lightweight Engine Hose and 666 Hose of Teflon.

Aeroquip 601 Hose provided CAA "fire-resistant" installations on all fuel and lube oil lines from the firewall forward. Substantial weight reduction and increased flexibility were added advantages.

Aeroquip 666 Hose of Teflon, with Aeroquip 624 Fire Sleeving, gave CAA "fireproof" protection for all hydraulic, de-icer and vacuum line installations. Practically unlimited service life is anticipated.

Both hose types use Aeroquip Detachable, Reusable Hose Fittings for quick assembly with bench tools. Total weight savings on this DC-3 is 17.86 lbs.

Make sure your aircraft "life lines" have all the safety and service life that can be attained. Specify Aeroquip Hose Lines on the next overhaul. Write for Service Reports #108 and #109.

Aeroquip Corporation, Jackson, Michigan
Western Division, Burbank, California

Aeroquip

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a "new" lodestar
for Col. D. Harold Byrd
by Dallas Aero Service

Yes, Col. D. Harold Byrd, prominent Texas oilman, today has a "new" Lockheed Lodestar as a result of the engineering, planning and craftsmanship of the skilled technicians at Dallas Aero Service. "New" safety, speed, economy and attractiveness are all combined in the Col. D. Harold Byrd airplane. Here are only a few of the many modifications and installations made by Dallas Aero Service to make a "new" Lodestar.

the complete dallas aero speed program kit consisting of:

Change angle of incidence • Installation of saddle type fairing between fuselage and stabilizer • Installation short tips on horizontal stabilizer • Installation of Learstar type intersectional fairing on stabilizer • Installation of flap-fairing closure between elevator and stabilizer • Removal of bat wings • Restriction of flap travel to 70 degrees and cut flap tracks • Rework trailing edge of wings and flap tract extension housings and incorporation of knife edge closure fairing extensions.

Other modifications and installations were:

A streamlined tailcone, eliminating center section "up" elevator • A 200,000 BTU Janitrol heating system • Incorporation of short stack exhaust system • Large picture windows • Convair wheels and brakes • Fire detection system • Dual fuel system • Lear spring tab rudder • DAS wheel well doors • A Bendix electrical system including feeder fault system • Bendix radar and radio • Design and installation of a new custom styled lightweight interior • Design and installation of custom cockpit, buffet, instrument panels, electrical panels and lighting system • Repainting of the airplane, including special design by a leading artist, using Hot Dupont Siliconized Enamels.

For further information, write, wire or call . . .

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